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12 Attorneys for Arizona Public Service Company

13 **BEFORE THE ARIZONA CORPORATION COMMISSION**

14 COMMISSIONERS

15 ROBERT BURNS, Chairman
16 BOYD DUNN
17 JUSTIN OLSON
18 SANDRA KENNEDY
LEA MÁRQUEZ PETERSON

19 IN THE MATTER OF THE APPLICATION
20 OF ARIZONA PUBLIC SERVICE
21 COMPANY FOR A RULING RELATING
22 TO ITS 2020 DEMAND SIDE
23 MANAGEMENT IMPLEMENTATION
24 PLAN.

DOCKET NO. E-01345A-19-0088

**APPLICATION FOR APPROVAL
OF APS'S AMENDED 2020
DEMAND SIDE MANAGEMENT
IMPLEMENTATION PLAN**

19 Arizona Public Service Company (APS or Company) submits its Amended 2020
20 Demand Side Management (DSM) Implementation Plan (Amended Plan) in order to
21 urgently respond to the COVID-19 crisis to help customers in financial need by
22 providing bundled DSM measures and services to reduce customer bills and provide
23 long-term energy savings. APS seeks expedited approval of its Amended Plan and
24 respectfully asks the Commission to address the matter as soon as practicable to allow
25 APS to respond to changing customer needs and market dynamics for the remainder of
26 2020 due to COVID-19. All elements of the original Plan filed on December 30, 2019
27 remain the same except where explicitly modified in this Amended Plan. The Amended
28 Plan proposes the same \$51.9 million budget as the original Plan and proposes to

1 maintain the current DSMAC charges approved in Decision No. 76313. In addition, the
2 Amended Plan proposes to reallocate \$7 million of the original Plan budget from
3 programs such as Residential and Commercial New Construction, among others, which
4 are seeing lower use due to COVID-19, to new programs and measures designed
5 specifically to help customers who are experiencing economic impacts of COVID-19,
6 such as emergency HVAC replacement, Limited-Income Weatherization support, and
7 help for non-profits and Title I schools. Finally, the Amended Plan requests increased
8 flexibility to move funds between programs and measures to allow funds to be spent
9 toward those programs that are benefitting customers most during the pandemic and
10 requests the ability to adjust spending caps and incentive levels to better serve customers
11 and meet market needs.

12 **I. SUMMARY OF AMENDMENTS TO 2020 DSM PLAN**

13 **A. Programs for Residential Customers**

- 14 1. Increased funding for Existing Homes to fund special higher
15 incentives during emergency HVAC replacements and forecasted
16 spending reductions for some non-HVAC replacement measures.
17 Increase the Quality Installation incentive for eligible residential
18 HVAC replacements from \$200 per unit to \$1,000 per unit for all
19 qualifying 14 SEER units, and to \$1,200 per unit for all qualifying
20 equipment 15 SEER and above.
- 21 2. Reduced budget for Residential New Construction as a result of
22 lower forecasted participation.
- 23 3. Increased funding for Limited-Income Weatherization including a
24 higher funding cap per home from \$6,000 to \$9,000 for
25 weatherization projects.
- 26 4. Reduced 2020 budget for direct install elements of Multi-Family
27 Energy Efficiency that require access to tenant dwelling units,
28 which has been restricted due to COVID-19.

1 **B. Programs for Non-Residential Customers**

- 2 1. Increased budget for Existing Facilities to fund special higher
3 incentives for qualifying emergency HVAC replacements, as well
4 as reduced spending for some measures with lower forecasted
5 participation due to COVID-19. Increase incentives for replacing
6 qualifying HVAC equipment up to 75% of incremental costs with a
7 maximum cap of no more than \$10,000 per unit.
- 8 2. Reduced budget for New Construction and Major Renovation,
9 which have lower forecasted participation volumes due to COVID-
10 19.
- 11 3. Increased budget for schools to support special higher incentives for
12 HVAC replacements and other potential school improvement
13 projects. Qualifying school HVAC replacement projects will be
14 eligible to participate in incentives outlined in the Existing
15 Facilities program.
- 16 4. Reduced budget for Energy Information Services due to lower
17 forecasted participation.

18 **C. DSM Initiatives Serving Both Residential and Non-Residential**

- 19 1. Reduced budget for Energy Storage and Load Management
20 (Rewards) due to lower forecasted participation in the smart
21 thermostat element of the program.
- 22 2. Reduced budget for EV Charging Demand Management because
23 this is a new proposed program currently awaiting approval.
- 24 3. Increased budget for Energy and Demand Education and
25 reallocated funds from some planned initiatives to support
26 increased basic customer energy efficiency education, outreach and
27 support. APS intends to expand capabilities for remote customer
28 DSM outreach services including a free virtual home energy

auditing service. APS also intends to offer enhanced energy services support for non-profits and community health and human services agencies, including conducting early season HVAC assessments at these facilities to help ensure HVAC equipment is summer-ready and limit mid-season HVAC emergencies.

II. UPDATED 2020 ESTIMATED SAVINGS GOAL

The revised 2020 DSM Plan is forecasted to achieve total estimated first year savings of 664,000 MWh of energy (when including the conversion of demand response savings into MWhs). This is in addition to the total savings of 5,791,690 MWh from 2011 through 2019 (including credit for pre-EES savings), for total estimated savings of 645,544,690 MWh by the end of 2020. The total cumulative savings represents more than 23% of APS's adjusted 2019 retail sales, which exceeds the 2020 Arizona Energy Efficiency Standard goal of 22% cumulative annual energy savings by almost 452,000 MWh.

III. APS REQUESTS A BUDGET OF \$51.9 MILLION

APS's proposed budget of \$51.9 million maintains its focus on providing customers with valuable saving opportunities while also benefiting the electric system by better aligning APS's DSM portfolio with system resource needs. Table 1 below reflects the sources of revenue to support this Plan and budget.

Table 1: Revenue Sources for Proposed Amended 2020 DSM Budget

Revenue Source	Budget
Total 2020 Budget	\$51,928,000
Base Rates	(\$20,000,000)
Collected but Unspent Funds	(\$3,284,124)
Collected but Allocated to Rewards	(\$1,928,000)
Subtotal	\$26,715,876
Less Gain on Sale of Assets Balance	(\$229,537)
2020 DSMAC Collections (over 12 months)	\$26,486,339

The proposed Amended Plan requests a budget of \$51.9 million for 2020, which will be funded by \$20 million collected in base rates; the application of approximately \$3.3 million of collected, but unspent DSMAC funds; \$1.9 million of approved and collected but not yet spent funds allocated for the Energy Storage and Load Management (Rewards) program; \$26.5 million projected to collect through the DSMAC during June 2020 through February 2021, less \$229,537 gain on sale of assets balance. The complete Amended Plan is attached as Exhibit A.

IV. REQUESTED WAIVERS

In order to respond to changing needs and circumstances due to the pandemic, APS requests additional flexibility for the remainder of 2020 to shift funds between programs to meet customer demand and market needs. For example, additional flexibility would allow APS to reallocate funds from programs that are not very active due to COVID-19 (such as Residential and Commercial New Construction) to programs that are experiencing increased needs due to COVID-19, such as emergency HVAC replacement, Limited Income Weatherization support, and help for non-profits and Title I schools. Presently, Decision No. 74406 allows APS to shift 50% of a program budget.¹ Because the duration of the current crisis and the full scope of the economic

¹ Decision No. 74406 prohibits funds for Low-Income Weatherization and schools programs from being shifted. APS does not request any change to this provision.

1 impacts remain unknown at this time, APS requests a waiver to these budget
2 requirements set forth in Decision No. 74406 to allow APS to shift unused funds from
3 one program to another up to 75% of an individual budget and between customer
4 segments as needed to best help customers during COVID-19. If a program or measure
5 experiences a significant downturn or reduced adoption, the waiver would grant APS the
6 authority to shift unused funds to programs or measures that are needed urgently
7 because of COVID-19. In return for this added flexibility during the approved waiver
8 period, and to allow for greater transparency, APS commits to provide quarterly spend
9 reports, notices of program modifications within 10 days of change(s) beyond the
10 current guidelines, and continued compliance with all non-dated requirements.

11 **IV. CONCLUSION**

12 APS respectfully requests that the Commission expeditiously approve this
13 Application, specifically including the following:

- 14 1. Approve APS's Amended 2020 DSM Plan in its entirety as discussed
15 herein and in Exhibit A;
- 16 2. For the remainder of 2020, grant APS a waiver to the Decision No. 74406
17 requirements that allow APS to shift a maximum of 50% of a program budget; and
- 18 3. Approve a 2020 DSM budget of \$51.9 million and maintain the DSMAC
19 charges approved in Decision No. 76313.

20

21 RESPECTFULLY SUBMITTED this 15th day of May 2020.

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By: /s/ David Hinkson

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1 ORIGINAL electronically filed
2 this 15th day of May 2020, with:

3 Docket Control
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7 COPY of the foregoing mailed/delivered
8 this 15th day of May 2020 to:

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19 AC
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Exhibit A



**Arizona Public Service
Company**

**Amended 2020
Demand Side Management
Implementation Plan**

May 15, 2020

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Amendment Attachment 1- 2020 DSM Demand Side Management Implementation Plan

I. Introduction

Arizona Public Service Company (APS or Company) files this Amendment to its 2020 Demand Side Management (DSM) Implementation Plan (2020 DSM Plan or Plan), filed December 30, 2019, in order to urgently respond to the COVID-19 crisis and the resulting economic disruptions to the State of Arizona and within APS's service territory. This effort will leverage current residential and commercial DSM programs to help individual customers and businesses in financial need with bundled DSM measures and services to reduce customer bills and provide long-term energy savings.

APS seeks expedited approval from the ACC for the Amended APS 2020 DSM Plan to reallocate funding and temporarily alter select current program guidelines and requirements to provide the greatest help through DSM programs to the most customers as soon as possible as described below. All elements proposed in the original Plan remain the same in this Amended Plan, except where explicitly modified in this supplement, including:

- APS proposes to maintain the proposed \$51.9 million budget, reallocating \$7 million of the original 2020 DSM Plan budget by: 1) reducing forecasted spending for programs and measures where it is unlikely APS can meet the original participation goals due to the economic impacts of COVID, and 2) increasing the budget for DSM programs and measures (such as emergency HVAC replacement) that best help support customers in need through the COVID crisis.
- APS proposes to temporarily suspend or alter select program guidelines, including current eligibility requirements for program participation and qualifying equipment and flexibility to shift budget as described herein. This will provide the flexibility necessary to adapt programs to best meet rapidly changing market conditions and customer needs.

APS requests expedited approval of its Amended Plan to facilitate APS's ability to respond quickly to changing customer needs and market dynamics for the remainder of 2020 to allow for adequate response and customer support throughout the COVID-19 crisis.

A. OBJECTIVES

In order to best support customers impacted by this rare global health and economic crisis, APS carefully considered how current DSM programs could be leveraged to provide assistance and meet customer needs through carefully targeted delivery of DSM-related programs and services. The objectives of the DSM customer support that APS seeks to offer through this supplemental Amended Plan filing include:

- Help for limited-income customers, including those recently unemployed by the crisis.
- Help for customers who face unexpected costs due to HVAC failures and other related equipment emergencies this summer.
- Help for non-profit organizations and agencies who provide community health and human services.
- Help for schools, historic facilities and other cultural sites that are important to the quality of life for Arizonans.

- Support for APS's trade allies who provide energy services, as long as they can do work in a safe manner.
- Support to help local small businesses continue operating through the economic impacts of this pandemic.

It is with these objectives that APS proposes the budget reallocations and other program modifications in this Amended 2020 APS DSM Plan.

II. Proposed Program Modifications

APS intends to repurpose a portion of its original 2020 DSM budget and utilize the existing DSM program framework to deliver services and provide support to APS customers who are being most impacted and to the organizations who are providing essential community services. The modified budget reallocates funding from current programs where the impacts of the crisis are likely to result in lower program participation. It moves this funding to programs that will provide essential help and emergency energy services to support customers in need, within the same total requested budget as the original 2020 DSM Plan. In addition, APS is requesting temporary changes to some current program guidelines including increased budget shifting flexibility and modifications to some program eligibility requirements in order to best serve customers at this critical time.

This section outlines the proposed budget reallocations and the requested program modifications for each DSM program as part of this Amended Plan.

Residential Programs

1. Existing Homes (Including Consumer Products, HVAC and Home Performance)

APS has increased the 2020 program budget for this program by a net increase of \$645,000 which includes increased funding for HVAC measures to fund special higher incentives for Quality Installation during emergency HVAC replacements, as well as forecasted spending reductions due to lower participation estimates for some non-HVAC replacement measures.

In addition to these budget changes, APS proposes the following temporary program modifications for the 2020 program year (with the program returning to the current program requirements effective January 1, 2021):

- Increase the Quality Installation incentive for eligible residential HVAC replacements from \$200 per unit to \$1000 per unit for all qualifying 14 SEER units, and to \$1200 per unit for all qualifying equipment 15 SEER and above.
- To qualify for these increased incentives, the following conditions must be met:
 1. The HVAC unit must be an emergency replacement of existing HVAC equipment that has failed or is failing. The incentive does not apply to early replacement of working equipment, or to new HVAC units that are not replacing existing equipment.
 2. To qualify, customers must self-attest that they have become unemployed due to the COVID emergency. To receive the increased incentives, participants will be required to sign a form that confirms they meet the program qualifications.

3. HVAC units must be replaced before December 31, 2020 or until funding is no longer available, whichever comes first.
 4. Customers must meet all other current program requirements.
 - Customers who do not meet the conditions above may still receive a \$200 Quality Installation incentive if they meet all other current program requirements.
2. **Residential New Construction –**
APS has reduced the 2020 budget by \$462,500 based on lower forecasted participation due to impacts of the COVID-19 crisis. APS is not proposing any other program modifications.
 3. **Limited Income Weatherization –**
APS recognizes that limited income customers are affected disproportionately by the COVID-19 crisis, so we have expanded the 2020 program budget for limited income weatherization, including increased funding support for limited income multifamily properties. APS has increased the 2020 budget from \$5,500,000 to \$7,000,000 based on an expected increase in customer needs and is proposing a temporary increase the funding cap per home from \$6,000 to \$9,000 (for weatherization projects performed by December 31, 2020) in order to provide support for larger efficiency projects, including emergency HVAC replacement and related repairs in cases where other assistance dollars may not be available. During this time, APS will seek to leverage federal weatherization funds and other sources of project funding to supplement APS program funds where possible. APS will track and report average costs per dwelling weatherized for the program in 2020 and use this information to propose any ongoing changes to the program's funding limits per dwelling in the 2021 DSM Plan. In addition to these program modifications, APS will provide an energy assistance hotline (described in the Energy and Demand Education Program) to help customers understand what energy assistance is available and enroll customers in programs.
 4. **Multi-Family Energy Efficiency**
APS has reduced the 2020 budget by \$245,000 due to lower expected participation volumes in the direct install elements of the program that require access to tenant dwelling units which has been restricted due to COVID-19 impacts. APS is maintaining the budget for all other program elements and will also be focusing on education and outreach for this customer segment as well as expanded support for limited income multifamily properties as part of the increase limited income weatherization budget in 2020.
 5. **Conservation Behavior**
APS is implementing the program as outlined in the original 2020 DSM Plan. APS has not changed the program budget and we are not proposing any program modifications at this time. This program provides energy savings information and education for customers that can be especially important at this time.

Non-Residential Programs (Solutions for Business)

1. Existing Facilities (Includes Large Existing Facilities and Small Business)

APS has increased the 2020 program budget by a net of \$145,386 to increase funding for special higher incentives for qualifying emergency HVAC replacements as outlined in this amended plan, as well as reduce spending for some measures due to lower forecasted participation due to COVID-19 impacts.

APS proposes the following program modification:

- Increase the incentives for replacing qualifying existing small packaged or split, single or three phase HVAC equipment (up to maximum size of 40 tons) to cover up to 75% of incremental costs with a maximum cap of no more than \$10,000 per unit.
- To qualify for these increased incentives, the following conditions must be met:
 1. HVAC unit must be an emergency replacement that is replacing existing HVAC equipment that has failed or is failing. Does not apply to early replacement of working equipment, or to new HVAC units that are not replacing existing equipment.
 2. HVAC units must be replaced before December 31, 2020, or until funding is no longer available, whichever comes first.
 3. Customers must meet all other current program requirements.
- Customers who do not meet the conditions above may still receive the standard program incentives if they meet all other current program requirements.

2. New Construction and Major Renovation

APS has reduced the 2020 budget by \$41,200 due to lower forecasted participation volumes and is not proposing any other program modifications.

3. Schools

APS has increased the 2020 budget by \$174,098 to support special higher incentives for HVAC replacements and other potential school improvement projects that could proceed while students are out of class. Qualifying projects will also be eligible to participate in the increased HVAC incentives outlined in the Existing Facilities program.

4. Energy Information Services

APS has reduced the 2020 budget by \$18,000 due to lower forecasted participation volume.

Demand Side Management Initiatives (Serving Residential and Non-Residential Customers)

1. Demand Response

APS has reduced the budget by \$70,000 and is not proposing any further program modifications.

2. Energy Storage and Load Management (Rewards)

APS has reduced the 2020 budget by \$590,284 due to lower forecasted participation volume in the smart thermostat element of the program. The original program participation goal has been revised from 40,000 to 35,000 thermostats due to a number of factors including COVID-19 related reductions in consumer spending and lower than anticipated participation from some thermostat brands. APS is not proposing any other program changes.

3. EV Charging Demand Management

APS has reduced the forecasted 2020 budget by \$127,500 because this is a new proposed program that is currently awaiting approval. As such, spending to date is \$0.

4. Subscription Rate Pilot

APS has reduced the forecasted 2020 budget for this pilot to \$0 as a result of the revised schedule for the APS rate case hearings, which will delay this pilot until the 2021 DSM Implementation Plan budget is approved by the Arizona Corporation Commission.

5. Building Codes and Appliance Standards

APS is not proposing any changes to this program or budget.

6. APS System Savings

APS is not proposing any changes to this program or budget.

7. Energy and Demand Education

APS has increased the program budget by \$590,000 and has reallocated funds from some planned initiatives to support increased basic customer energy efficiency education, outreach and support. APS intends to expand capabilities for remote customer DSM outreach services including free virtual home energy auditing service. In addition, APS intends to offer enhanced energy services support for non-profits and community health and human services agencies, including conducting energy audits and HVAC assessments at these facilities to reduce energy costs and help ensure that HVAC equipment is summer ready to limit mid-season HVAC emergencies.

III. Proposed Modifications to Program Implementation Rules

APS's proposed modifications to the DSM 2020 Plan are based on informed estimates of current and expected market and economic impacts as a result of the COVID-19 crisis. The total duration of the current health crisis and full scope of the economic impacts remain unknown at this time. As a result, APS requests a temporary waiver of the Arizona Corporation Commission's budget shifting requirements to allow APS to shift up to 75% of an individual program's budget and shift between customer segments enabling greater flexibility in providing agile support for customers where it is needed most. For example, if a program or measure sees an impact that APS did not forecast sufficiently, such as a significant downturn or reduced adoption, APS requests the authority to shift unused funds to programs or measures where it is being used or is urgently needed as a result of the crisis. This added flexibility will provide customers with support where it is needed urgently in response to this unprecedented situation we are all navigating by safeguarding against stranding funds that may otherwise be left unspent.

In return for this added flexibility, APS will commit to the following reporting on spend activity while the waiver is in effect:

- Quarterly spend reporting during this crisis period to allow for greater ongoing transparency into any potential funds that are shifted between programs and measures;
- A notice of program modification within 10 calendar days of shifting any funds beyond the current guidelines;
- Continued compliance with all non-dated requirements.

Further, APS commits that it will not shift funds out of the Limited Income Weatherization or Schools Programs, consistent with current budget shifting guidelines for these programs.

IV. Updated 2020 Estimated Savings Goal

APS has recalculated the forecasted savings for 2020 based on the revisions in the Amended Plan, and currently estimates savings of 116 MW and 123,000 MWh from Residential DSM programs, 29 MW and 107,000 MWh from Non-Residential DSM programs, and 99 MW and 434,000 MWh from DSM Initiatives. In total, APS forecasts the Amended 2020 DSM Plan will achieve total estimated first year savings of 664,000 MWh of energy (when including the conversion of demand response savings into MWh).

As reported in the 2019 DSM Annual Progress Report, at the end of 2019 APS had achieved cumulative savings of 19.9% or 5,453,606 MWh, which is slightly higher than the 19.5% EES Goal for 2019. The cumulative EES goal in 2020 is calculated to be 6,003,692 MWh, and APS has a pre-EES credit balance of 328,955 MWh applied to 2020. Therefore, APS needs to achieve at least 212,002 MWh of incremental savings to hit the 2020 goal of 22%, and with this Amended Plan filing we project savings of 664,000 MWh which will exceed the 2020 goal by nearly 452,000 MWh.

Calculating Updated Compliance Goal for 2020

Adjusted 2019 retail sales (excl. losses, Freeport-McMoRan sales) =	27,289,510 MWh
Total 2020 cumulative savings goal (22% of 2019 retail sales) =	6,003,692 MWh
Minus Credit for Pre-EES savings (from 2005-2010) =	1,093,892 MWh
Minus Savings from 2011-2019 =	4,697,798 MWh
Total 2020 Savings Goal to Achieve Compliance =	212,002 MWh
Actual Est. 2020 Savings =	664,000 MWh
Total Est. Cumulative Savings =	6,455,690 MWh
Savings Est. in Excess of 2020 Cumulative Savings Goal =	451,998 MWh

In total, the Amended Plan forecasts total estimated first year savings of 664,000 MWh of energy (when including the conversion of demand response MW savings into MWh). This is in addition to the total cumulative savings to date of 5,791,690 MWh (including credit for pre-EES savings), for total estimated cumulative savings of 6,455,690 MWh by the end of 2020. The total savings represents 23.6% of APS's adjusted 2019 retail sales, which exceeds the 2020 Arizona Energy Efficiency Standard goal of 22% cumulative annual energy savings by almost 452,000 MWh.

The EE Rules require that the Company's Plan include a description of APS's compliance with the requirements of the EE Rules for the previous calendar year.¹ APS's DSM program results for 2019 are fully described and documented in the Company's Demand Side Management Annual Progress Report (2019 DSM APR), which APS filed with the Commission on March 1, 2020.²

Prior to filing the original and amended 2020 DSM Plans, APS held multiple meetings with stakeholders to review the Plan and receive input from various members of the DSM Collaborative group whose membership includes DSM experts.

V. Updated Budget

A. DSM BUDGET

Table 1 below shows the Amended Plan revised 2020 estimate of DSM spending by program based on the reallocation of program funds and modifications to program elements as proposed herein. The budget in this Plan represents the estimated spending required to meet the revised 2020 DSM savings forecast of 244.4 MW and 663,569 MWh. These projections are based on APS's best current forecasts of market penetration and customer demand for each program measure, but due to extenuating circumstances around the COVID-19 crisis, APS requests additional budget flexibility to address unforeseen needs as proposed in this Amended Plan. The table below includes the anticipated budget by program, broken down by spending category.

¹ A.A.C. R14-2-2405(B).

² See Docket No. E-00000U-18-0055.

AMENDED APS 2020 Demand Side Management Implementation Plan

Table 1
Estimated 2020 DSM Spending by Program*

Program	Rebates and Incentives (\$)	Program Implementation (\$)	Program Marketing (\$)	Planning and Administration (\$)	Training & Technical Assistance (\$)	Consumer Education (\$)	Financing (\$)	Total Program Cost (\$)
RESIDENTIAL								
Existing Homes	\$5,939,699	\$1,080,500	\$225,000	\$399,288	\$445,000	\$0	\$0	\$8,089,487
Residential New Construction	\$2,042,500	\$625,000	\$30,000	\$190,000	\$20,000	\$20,000	\$0	\$2,927,500
Multi-Family Energy Efficiency	\$1,002,500	\$253,719	\$5,000	\$130,000	\$190,000	\$227,000	\$0	\$1,808,219
Limited Income Weatherization	\$6,059,000	\$305,000	\$0	\$240,000	\$51,000	\$350,000	\$0	\$7,005,000
Conservation Behavior	\$599,950	\$1,220,000	\$0	\$80,000	\$0	\$0	\$0	\$1,899,950
Totals for Residential	\$15,643,649	\$3,484,219	\$260,000	\$1,039,288	\$706,000	\$597,000	\$0	\$21,730,156
NON-RESIDENTIAL								
Existing Facilities	\$5,708,363	\$2,008,176	\$200,000	\$375,500	\$870,000	\$150,000	\$0	\$9,312,039
New Construction and Major Renovation	\$681,305	\$435,617	\$20,000	\$58,150	\$45,000	\$0	\$0	\$1,240,072
Energy Information Services	\$112,800	\$205,500	\$10,000	\$6,000	\$15,000	\$0	\$0	\$349,300
Schools	\$1,195,236	\$470,000	\$30,000	\$50,000	\$60,000	\$35,000	\$0	\$1,840,236
Totals for Non-Residential	\$7,697,704	\$3,119,293	\$260,000	\$489,650	\$990,000	\$185,000	\$0	\$12,741,647
DEMAND SIDE MANAGEMENT INITIATIVES								
Demand Response	\$0	\$2,000,000	\$0	\$230,000	\$0	\$0	\$0	\$2,230,000
Energy Storage and Load Management ("Rewards")	\$3,754,862	\$1,976,000	\$25,000	\$250,000	\$0	\$0	\$0	\$6,005,862
Building Code and Appliance Standards	\$0	\$80,000	\$0	\$20,000	\$100,000	\$0	\$0	\$200,000
APS System Savings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
EV Charging Demand Management	\$37,500	\$82,500	\$15,000	\$10,000	\$5,000	\$10,000	\$0	\$160,000
Subscription Rates Pilot Study	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Energy and Demand Education	\$0	\$414,959	\$0	\$310,000	\$200,000	\$4,729,376	\$0	\$5,654,335
Totals for DSM Initiatives	\$3,792,362	\$4,553,459	\$40,000	\$820,000	\$305,000	\$4,739,376	\$0	\$14,250,197
Segment Totals	\$27,133,715	\$11,156,971	\$560,000	\$2,348,938	\$2,001,000	\$5,521,376	\$0	\$48,722,000

Program Costs	\$48,722,000
Measurement, Eval & Research	\$3,206,000
TOTAL	\$51,928,000

*Includes \$1,928,000 in funding for the Rewards program from collected but unspent program funds.

B. DEMAND SIDE MANAGEMENT ADJUSTMENT CHARGE

In this supplemental Amended Plan filing, APS is proposing to maintain the current DSMAC charges approved in Decision No. 76313, which are currently set at \$0.000982 per kWh and \$0.353 per kW. APS proposes to use \$3,284,124 in collected but unspent funds in the DSMAC balance account to fund the 2020 DSM program budget without needing to increase DSMAC collections. Table 2 below shows the 2020 revenue requirements for the DSMAC.

In accordance with Decision No. 76313, APS is funding the Energy Storage and Load Management (Rewards) initiative with collected, but unspent funds, from the DSMAC balancing account. In 2020, the total of \$1,928,000 in remaining funds originally earmarked for this program will be used to fund remaining energy storage and load management technology installations.

Table 2
2020 Amended Plan Revenue Requirements for DSMAC

Total 2020 DSM Budget	\$51,928,000
Amount Recovered in Base Rates	(\$20,000,000)
Collected and Allocated to Rewards	(\$1,928,000)*
Collected but Unspent Funds	(\$3,284,124)*
Subtotal	\$26,715,876
Gain on Sale of Assets Balance	(\$229,537)
Total Revenue to be Collected from DSMAC (Assuming a 12-month collection period)	\$26,486,339

*From the DSMAC Balancing Account.

C. PERFORMANCE INCENTIVE

Although the 2020 DSM Plan achieves compliance with the Energy Efficiency Standard, APS is not requesting a performance incentive as part of the 2020 DSM plan in order to focus all funds on customer programs.

VI. Updated DSM Energy Savings and Benefits

Table 3 below provides details of the expected annual and lifetime energy savings and peak demand reductions from each DSM program and initiative, and a summary of the net benefits generated in the Amended 2020 DSM Plan. These are in addition to energy savings, costs and net benefits associated with APS DSM activities undertaken during the 2005 through 2019 timeframe, which are reported each year in APS's Semi-Annual DSM Report filings. The lifetime energy savings are the estimated savings that will result over the expected lifetime of all program measures installed in 2020. Note that the current construct for measuring DSM net benefits requires use of the societal cost test. This test was developed for energy efficiency programs and, as such, it is not currently designed to capture all of the benefits of emerging load shifting and electrification

AMENDED APS 2020 Demand Side Management Implementation Plan

measures. APS will work to evaluate the results of these pilots and provide a report of program costs and net benefits in the DSM Annual Progress Report.

Table 3
2020 DSM Savings and Benefits

Program	Annual Coincident Demand Savings at Generator (MW)	Annual Savings at Generator (MWh)	Lifetime Energy Savings (MWh)	Cost Test Benefits (\$)	Cost Test Costs (\$)	Lifetime Net Benefits (\$)
RESIDENTIAL						
Existing Homes	71.6	24,560	270,600	13,275,277	12,771,172	504,105
Residential New Construction	12.8	18,311	356,911	12,757,222	12,348,877	408,346
Multi-Family Energy Efficiency	3.9	7,144	127,869	3,153,012	2,837,735	315,277
Limited Income Weatherization	1.8	3,551	63,912	946,608	946,608	0
Conservation Behavior	36.3	71,615	71,615	1,453,971	1,383,057	70,914
Totals for Residential	126.3	125,181	890,907	31,586,091	30,287,449	1,298,642
NON-RESIDENTIAL						
Existing Facilities	21.7	80,158	1,233,240	28,939,031	22,999,723	5,939,309
New Construction and Major Renovation	2.6	7,831	132,200	3,074,646	2,889,267	185,380
Energy Information Services	1.5	6,740	33,701	798,132	669,224	128,907
Schools	2.8	11,755	203,980	4,649,713	3,572,191	1,077,522
Totals for Non-Residential	28.6	106,485	1,603,121	37,461,522	30,130,405	7,331,118
DEMAND SIDE MANAGEMENT INITIATIVES						
Demand Response	25.0	109,500	116,618	0	0	0
Energy Storage and Load Management ("Rewards")	76.2	333,754	6,822	0	0	0
Building Code and Appliance Standards	7.2	26,629	226,021	0	0	0
APS System Savings	0.0	5,160	77,395	0	0	0
EV Charging Demand Management	0.0	0	0	0	0	0
Subscription Rates Pilot Study	0.0	0	0	0	0	0
Energy and Demand Education	0.0	0	0	0	0	0
Totals for Demand Side Management Initiatives	108.4	475,043	426,855	0	0	0
TOTAL	263.2	706,708	2,920,883	69,047,614	60,417,854	8,629,760

Amendment Attachment 1



**Arizona Public Service
Company**

**Demand Side Management
2020 Implementation Plan**

December 30, 2019

APS 2020 Demand Side Management Implementation Plan

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I. Executive Summary

The Arizona Public Service Company (APS or Company) 2020 Demand Side Management (DSM) Implementation Plan (2020 DSM Plan or Plan) outlines the Company's plans for achieving energy and load management savings through cost effective demand side management programs in accordance with Arizona's Electric Energy Efficiency Standards A.A.C. R14-2-2401 *et seq.* APS developed the 2020 DSM Plan in collaboration with a diverse group of stakeholders including input from the DSM Collaborative Group, the Integrated Resource Plan working group, and trade ally focus groups.

The current portfolio of DSM programs has resulted in 5,737,000 MWhs of energy savings for APS customers since 2005, including estimates savings from 2019, while producing sustained market effects that have helped increase availability and lower costs of energy efficiency products and services in Arizona. The 2020 DSM Plan is estimated to produce 707,000 MWhs of incremental annual energy savings in 2020, for total forecasted cumulative savings of 6,444,000 MWhs from 2005 through the end of 2020, which will achieve compliance with the 2020 EES goal of 22% cumulative energy savings by 2020 set forward in A.A.C. R14-2-2404.

APS is proud of its success working with customers to achieve the significant energy saving goals of the Arizona Energy Efficiency Standard during the past decade of DSM programs. However, while we have historically measured kWh savings for compliance, Arizona's resource needs have changed dramatically over this period. Today and in the future, not all kWh savings are equal - while on-peak savings are still highly valuable, an abundance of solar energy generated in midday hours means that saving energy off-peak has considerably less benefit in terms of current resource needs and customer value, particularly for the majority of participants who are on modern time-of-use electric service plans.

The Arizona Corporation Commission (Commission or ACC) has recognized the need to evolve the DSM portfolio, and in Decision No. 75679, ordered APS to re-evaluate DSM programs to focus on reducing peak energy use and demand. In response, APS has reassessed each DSM measure in terms of its relative value in providing a load shape of savings that aligns with system resource needs (see Appendix B for more information on savings load shapes by measure). As the Commission noted in Decision No. 75679, the focus of DSM needs to be peak demand savings and shifting energy use away from peak times to off-peak times. This approach properly treats the DSM portfolio as a resource that better aligns with regional energy needs.

APS's 2018 and 2019 DSM Plans took steps to address these changing conditions, and the 2020 Plan continues this evolution (note the 2020 Plan addresses all elements of the 2018-2019 DSM Plans and enables Commission Staff to review the 2020 DSM Plan only, without requiring separate reviews of the 2018 and 2019 plans).

The objective is to maximize customer value from DSM investments by not focusing merely on accumulating kWh reductions, but by evolving the portfolio to better address system conditions and embrace promising new technologies. This focus supports broader clean energy objectives by using DSM programs to help store, shift, reduce and manage energy consumption based on when clean renewable energy is available. Further, it creates customer bill savings with modern energy service plans, which provide significant savings opportunities for customers who can shift their energy use off-peak.

APS worked with stakeholders to create a 2020 DSM Plan that meets compliance with the Energy Efficiency Standard while also moving the DSM portfolio into the future beyond the current standard. To accomplish this, the Plan is designed to achieve multiple objectives including: 1) Increasing the mix of clean renewable energy used to meet Arizona's energy needs, 2) Maintaining and improving electric system reliability, and 3) Supporting energy affordability for all customers with cost effective energy education tools, with additional focus on serving limited income customers. With these goals in mind, APS is proposing many exciting new opportunities for customer savings and benefits in the 2020 DSM Plan including the following:

Enhanced Limited Income Programs

- New increased energy savings opportunities for local non-profit community organizations.
- New specialized Home Energy Reports delivered to all households enrolled in the APS Energy Support program.
- A 50% increase in weatherization program funding.

New/Expanded DSM Services for Customers

- A new online marketplace offering customers convenient access to shop for energy saving products and learn about APS rebates and programs.
- New updated Home Energy Reports delivered to more than double the current number of participants.
- A new digital app where customers can see their personalized energy usage history and get real time energy use feedback.
- New innovative customer programs including smart new home community and subscription rate pilots.

New Connected Devices

- New rate optimized smart thermostats that can automatically respond to APS time-of-use service plans and provide significant bill savings for customers.
- New connected water heaters that can be dispatched to store excess midday solar energy and reduce peak demand.
- New connected pool pumps that provide energy savings and capabilities for connecting to future utility demand response programs.

New Energy Efficiency Savings Opportunities for Non-Residential Customers

- Working in collaboration with Southwest Energy Efficiency Project (SWEET) and other stakeholders, APS is proposing incentives for several new energy efficiency technologies that provide cost effective savings opportunities for APS non-residential customers, including networked thermostats, compressed air system upgrades, and data center efficiency measures.

New Demand Management for Electric Vehicle Charging

- The 2020 DSM Plan positions APS to address the emerging adoption of electric vehicles (EVs) by proposing a new DSM program designed to gather better data on EV charging energy use patterns, encourage beneficial off-peak EV charging behavior, and provide opportunities to connect to EV charging stations to proactively plan for future demand response and EV load management programs.

The 2020 DSM Plan was developed in coordination with stakeholders and includes many new opportunities for customer energy savings and benefits. APS proposes to fund the Plan using a combination of DSM funding in base rates and currently collected, but unspent funds to enable the DSM adjustor charge to be reduced to \$0.00 per kWh and \$0.00 per kW (a unique opportunity in 2020 due to current status of collected funds). APS requests timely Commission review in order to begin delivering these enhanced program offerings and bill savings for customers as soon as possible.

II. Introduction

The 2020 DSM Plan includes a balanced mix of programs and savings opportunities targeted to reach APS's diverse customer segments and markets for both Residential and Non-Residential customers. These programs are expected to produce cost effective and demand savings in 2020. As discussed herein, the 2020 Plan proposes to: 1) continue previously approved programs with some modifications, 2) modify or eliminate measures that do not align with APS resource needs or where the market is transformed to the point that customer funded incentive are no longer needed, and 3) introduce new emerging DSM technologies and focus program efforts on the highest value savings.

A. HIGHLIGHTS OF THE PLAN

DSM Portfolio

- Requests continuation of Energy Efficiency (EE) and Demand Response (DR) programs approved in the most recent DSM Implementation Plan¹ and addresses all proposed program changes from the APS 2018 and 2019 DSM Implementation Plans that are currently awaiting Commission review, providing the Commission with an updated comprehensive plan for 2020.
- Discusses changing resource needs, opportunities for DSM programs to assist with integration of intermittent renewable resources, and the need to better consider the value of load shifting and peak demand reductions.
- Expands the Cool Rewards demand response program to include small business customers and increases the 2020 participation goal to 40,000 smart thermostats (more than double current participation), which is estimated to provide 52 MW of demand response peak capacity.
- Expands the Energy and Demand Education program with greater customer outreach and education, including an online marketplace where customers can learn about how to select the most efficient home energy products and link to online offers and discounts. The program will also offer new online energy management information and data analysis tools for non-residential customers and trade allies.
- Consolidates the separate "Transmission and Distribution" and "Load Management Technologies" pilot programs into the Demand Response, Energy Storage and Load Management (Rewards) pilot program, which meets the same program objectives.
- Proposes a high value DSM portfolio that will produce an estimated 707,000 MWhs of incremental annual energy savings and 263 MW of peak demand savings, with a focus on program opportunities that help reduce summer peak demand and shift load to the midday to allow better integration of intermittent solar resources on the grid.
- Proposes a 2020 DSM budget of \$51.9 million to be funded through \$20 million in base rates and \$31.9 million in currently collected but unallocated DSM funds, and proposes to reduce the DSM Adjustor Charge (DSMAC) to \$0.00 per kWh and \$0.00 per kW.

¹ Decision No. 76313 (Aug. 23, 2017).

Programs for Residential Customers

- Focuses on providing assistance for limited income customers, including a 50% funding increase for the weatherization program and new specialized Home Energy Reports with low/no cost savings tips and information about energy assistance programs.
- Proposes a new Subscription Rate pilot—to be implemented following approval of APS's 2019 Rate Case—for up to 5,000 residential customers with half of the participants receiving rate optimized smart thermostats and half included as a comparison group to measure differences in energy use patterns.
- Proposes a new connected pool pump pilot that provides customer energy savings and capability to connect pumps to future demand response and load management programs.
- Continues current incentives for the Residential New Construction Program and proposes three new pilot measures including EV ready pre-wiring, connected water heating, and induction cooking.
- Proposes a connected community applied research project with homebuilders to study emerging energy efficiency and load management opportunities in residential new construction.
- Creates a comprehensive “Existing Homes” program by combining the current “Consumer Products,” “Home Performance with ENERGY STAR,” and “Existing Homes HVAC” programs into one consolidated program to streamline program delivery and make it easier for customers and trade allies to find all of the DSM opportunities available for existing homes.

Programs for Non-Residential Customers

- Maintains a separate Schools program where qualifying school districts can benefit from an expanded list of energy efficiency rebates and savings opportunities.
- Launches a new initiative to help local non-profit community agencies by giving them access to an expanded list of rebates.
- Moves two measures (compressed air condensate drains and upgraded receivers) from custom to the prescriptive list. These measures have been found to be cost effective within the custom program - moving them to the prescriptive list will help increase participation and save APS implementation costs required to review custom applications.
- Proposes to add five new beneficial electrification pilot measures to the Non-Residential Existing Facilities and New Construction programs including standby truck refrigeration, electric forklifts, and three airport electrification measures. These measures provide significant customer benefits including improved energy efficiency, energy bill savings, reduced emissions, lower reliance on fossil fuels, and benefits to the electric system from the energy storage and load shifting capabilities of these technologies.
- Creates a comprehensive “Existing Facilities” program by combining the current “Large Existing Facilities” and “Small Business” programs into one consolidated program. This will streamline program delivery and administration. The current programs are already being marketed to customers as part of the comprehensive “Solutions for Business” program so this change will not impact the program marketing.

B. CHANGING RESOURCE NEEDS AND DSM OPPORTUNITIES

In addition to achieving compliance with the Energy Efficiency Standard, the 2020 DSM Plan was developed with a look towards the future, beyond the current Standard. The Plan includes a balanced portfolio of programs and technologies designed to provide value for all customers by cost effectively helping to meet Arizona's energy resource needs while supporting the goals of clean energy, energy affordability, and reliability.

1. Clean Energy

APS will use DSM programs as a tool to reduce air emissions and achieve broader clean energy objectives by helping customers save energy and reduce peak demand, shift the timing of when they use energy into periods of peak renewable energy production, and utilize energy storage to store excess renewable generation for use at other times.

DSM has evolved significantly in recent years, and DSM programs can play an important role in helping to integrate higher amounts of intermittent clean, renewable energy sources into Arizona's energy mix. The programs can not only directly reduce emissions by helping to lower overall usage and reduce peak demand, but they can also be used to shape energy consumption patterns to better match the times of day when clean, renewable energy is available. For instance, the award winning APS Rewards Program supports clean energy goals by working with customers to optimize the control of water heaters, batteries, and smart thermostats to reduce early evening peak energy demands while also shifting energy usage into the middle of the day when there is often excess solar energy being produced in the region. This has the dual benefit of helping to integrate more clean solar energy into the overall energy mix while also reducing the need for peak energy resources.

2. Energy Affordability

APS will develop and implement DSM programs and education outreach efforts that can help all customers save on their energy costs, with a focus on helping limited income customers and disadvantaged communities mitigate their energy affordability challenges.

The 2020 DSM Plan supports the goal of energy affordability for all APS customers by providing a balanced portfolio of programs with savings opportunities available for all types of customer segments and a wide variety of energy end uses. In addition, the Plan provides increased support for limited income customers and disadvantaged communities, including:

- A 50% increase in funding for the Limited Income Weatherization program that offers free home weatherization improvements for income-qualified customers.
- Increased funding for the Multi-Family Energy Efficiency program, which supports energy efficiency improvements for low and moderate-income rental communities.
- A new Home Energy Report within the Conservation Behavior program that will be delivered to all eligible customers who qualify for the APS Energy Support program. This report will include targeted information about low/no cost energy savings tips and support programs available for limited income customers.

- A new initiative within the Large Existing Facilities and New Construction Programs that provides qualifying non-profit community organizations with access to an expanded list of energy efficiency rebates.

In addition to this focus on limited income customers in the 2020 Plan, exciting opportunities are emerging with new technologies that offer all customers unprecedented capabilities for conveniently monitoring and controlling their energy use and peak demand. By combining these technologies with modern rate plans, it rewards customers for conserving energy when demand on the grid is highest, to the benefit of all customers, while also encouraging customers to use energy when it is abundant and less expensive, such as the middle of the day when solar production is the highest.

3. Reliability

APS will use DSM to support system reliability in several ways including reducing peak demand, shifting load to help alleviate low load conditions and improve the reliability of intermittent resources, and by providing demand response capabilities that can be deployed to help meet system or local transmission system needs.

To maximize the value of DSM as a reliable resource, APS continually strives to align DSM programs with regional resource needs as much as possible. While APS's peak energy needs continue to grow during the summer, milder non-summer months do not see the same load growth. In fact, these non-summer months now pose a different challenge due to the penetration of solar during midday, low-load periods. During these times, APS faces potential reliability challenges on two fronts: first in keeping enough generation online during the middle of the day to be able to meet evening peak demand, and second in addressing feeder level voltage and frequency issues that can result from high penetrations of distributed solar generation.

APS continues to evolve the DSM portfolio to align with these changing resource needs by placing greater emphasis on programs that reduce energy use during summer late afternoon and early evening hours. In fact, to align with changing resource needs, load management programs that *shift* consumption into the period of peak solar production (10am-2pm) during non-summer months are particularly valuable to the system. These programs can have the benefits of reducing total costs of serving load by taking advantage of abundant low to negative cost energy, while increasing the ability of the grid to accept more renewable energy and flattening system load shapes to improve overall system reliability.

Recognizing the need to reassess the DSM portfolio and make changes to reflect current circumstances, Decision No. 75679 ordered that:

Arizona Public Service Company, in its 2018 and future DSM Implementation Plans, further increase the focus on peak demand reductions (MW) from EE, DR, storage, and load management programs that reduce customer energy demand during the period of system peak demand.

In response to this Order, APS re-analyzed each DSM technology according to the profile of annual savings that it typically provides and the daily and seasonal load shape of savings it

produces. In addition to traditional cost-effectiveness metrics, each DSM measure was also assessed according to the amount of savings it provides during high value, summer weekday 3-8pm on-peak hours, and by the amount of savings it provides during low-value, midday periods from 10am-3pm October through April. To create a high value DSM portfolio, APS focused on measures that provide savings during on-peak hours that align with APS resource needs, and similarly de-emphasizing measures that provide savings when excess solar production creates an overabundance of energy in the region and EE savings have limited value on the grid. The results of the load shape analysis are provided in Appendix B.

As a result of this analysis and in recognition of ongoing market dynamics in the adoption of new energy technologies, APS has developed a proposed DSM portfolio for 2020 that offers a better path towards incorporating high-value distributed energy resource (DER) opportunities in response to Decision No. 75679. It continues the portfolio transition to reduce spending on technologies that do not produce the most favorable energy saving load shapes and where the market is rapidly transforming to the point where incentives are not needed (i.e. LED lighting). The proposed Plan focuses program efforts towards emerging energy efficiency, energy storage, and peak demand management program opportunities that will drive market adoption, provide high value to customers, and align better with current and future system resource needs.

As recognized in Decision No. 75679, the future of DSM involves an integrated approach to DERs for managing energy demand and shifting load on the grid. In such a changing environment, it is important we continually evolve the DSM portfolio to address ongoing resource needs while integrating new energy management technologies. APS looks forward to maintaining an open dialogue about how DSM can continue to evolve to meet Arizona's resource needs and achieve the Commission's energy policy objectives.

III. 2020 Estimated Savings Goal

APS estimates that at the end of 2019, the portfolio of Commission approved DSM programs will have saved 5,737,000 MWhs towards an estimated compliance goal of 6,008,000 cumulative MWhs in 2020 (representing 22% of APS's estimated 2019 retail sales of 27,308,429 MWhs excluding losses and sales to Freeport-McMoRan facilities that are exempt from the EES, rounded to the nearest 1,000 MWhs). The 2020 DSM savings goal of 271,000 MWhs represents the amount of savings needed to achieve compliance with the overall EES savings goal of 22% cumulative annual energy efficiency savings by 2020.

Calculating Compliance Goal for 2020

Est. 2019 retail sales (excl. losses, Freeport-McMoRan sales) = 27,308,429 MWhs
Total 2020 cumulative savings goal (22% of 2019 retail sales) = 6,008,000 MWhs
Minus Credit for Pre-EES savings (from 2005-2010) = 1,094,000 MWhs
Minus Savings from 2011-2019 (est.) = 4,643,000 MWhs
Total 2020 Savings Goal to Achieve Compliance = 271,000 MWhs
Actual Est. 2020 Savings = 707,000 MWhs
Total Est. Cumulative Savings = 6,444,000 MWhs
Savings Est. in Excess of 2020 Cumulative Savings Goal = 436,000 MWhs

In 2020, APS expects to achieve savings of 126 MW and 125,000 MWh from Residential DSM programs, 29 MW and 107,000 MWh from Non-Residential DSM programs, and 108 MW and 475,000 MWhs from DSM Initiatives. In total, the Plan forecasts total estimated first year savings of 707,000 MWh of energy (when including the conversion of demand response MW savings into MWhs). This is in addition to the total savings of 5,737,000 MWhs from 2011 through 2019 (including credit for pre-EES savings), for total estimated savings of 6,444,000 MWhs by the end of 2020. The total cumulative savings represents more than 23% of APS's adjusted 2019 retail sales, which exceeds the 2020 Arizona Energy Efficiency Standard goal of 22% cumulative annual energy savings by 436,000 MWhs.

The EE Rules require that the Company's Plan include a description of APS's compliance with the requirements of the EE Rules for the previous calendar year.² APS's DSM program results for 2018 are fully described and documented in the Company's Demand Side Management Annual Progress Report (2018 DSM APR), which APS filed with the Commission on March 1, 2019.³ The Annual Progress Report with results from 2019 will be filed by March 1, 2020.

Prior to filing the 2020 DSM Plan, APS held meetings with stakeholders to review the Plan and receive input from various members of the DSM Collaborative group whose membership includes DSM experts.

² A.A.C. R14-2-2405(B).

³ See Docket No. E-00000U-18-0055

IV. Demand Side Management Portfolio

APS is proposing a modified portfolio structure in 2020 to streamline program delivery, reduce administrative overhead and better serve customer needs. APS's proposed DSM program portfolio for 2020 includes the following programs. For more information on the current program structure see Appendix A - Description of Previously Approved DSM Programs.

Residential Programs

- (1) Existing Homes (Includes Consumer Products, HVAC and Home Performance)
- (2) Residential New Construction
- (3) Limited Income Weatherization
- (4) Multi-Family Energy Efficiency
- (5) Conservation Behavior

Non-Residential Programs (Solutions for Business)

- (1) Existing Facilities (Includes Large Existing Facilities and Small Business)
- (2) New Construction and Major Renovation
- (3) Schools
- (4) Energy Information Services

Demand Side Management Initiatives (Serving both Residential and Non-Residential segments)

- (1) Demand Response
- (2) Energy Storage and Load Management (Rewards)
- (3) EV Charging Demand Management
- (4) Subscription Rate Pilot
- (5) Building Codes and Appliance Standards
- (6) APS System Savings
- (7) Energy and Demand Education

APS intends to continue current programs approved in the most recent DSM Implementation Plan and continue all current incentive levels unless otherwise specified herein.⁴

In Decision No. 74406 the Commission allowed APS to reduce DSM program incentive levels to respond to market conditions or to more effectively manage program spending upon providing 30-day advance notice to the Commission. Since 2014, when the Commission reached this decision, the market for demand-side management has changed significantly. Many utilities around the country are geo-targeting demand-side management programs to defer specific distribution capital projects and take advantage of the locational value of demand-side management. In such instances, it may be prudent to offer increased incentives to a subset of customers. It may also be prudent to adjust incentives for many other reasons including to increase participation, respond to changes in market prices, or proactively assist targeted customer groups or system needs.

APS requests the flexibility to adjust rebates as a means to customize services to meet customer needs or respond to changing market conditions. The Company requests the ability to both

⁴ Decision No. 76313 (Aug. 23, 2017).

increase and decrease incentives upon providing 30-day notice to the Commission, including justification for why the change is needed.

The 2020 DSM Implementation Plan addresses all proposed program modifications included in the 2018 and 2019 DSM Implementation Plans currently awaiting Commission review. This will allow Commission Staff to review one 2020 DSM Plan that includes requests from the 2018 and 2019 DSM Plans in one comprehensive updated plan for moving DSM forward.

A. RESIDENTIAL DSM PROGRAMS

Proposed Program Modifications

1. Existing Homes Program

APS is combining the current Consumer Products, Existing Homes HVAC, and Home Performance with ENERGY STAR programs into one comprehensive Existing Homes program. The combined program will offer a one-stop shop for APS customers and local trade allies to access all of the DSM program savings opportunities that are available for existing homes under one convenient umbrella. The combined program offers many benefits and makes sense within the context of the current DSM Portfolio for several reasons including:

- It is clearer and more transparent for customers and trade allies to be able to access all DSM opportunities for Existing Homes under one program umbrella.
- With the discontinuation of rebates for LED lightbulbs and pool pumps in 2018, the Consumer Products program is currently limited to the retail smart thermostat measure. Because smart thermostats are also incorporated into the Existing Homes HVAC and Home Performance programs, there is significant overlap across the three current programs. Combining into one program will reduce overhead and streamline program delivery while also helping to better integrate messages between retail and contractor-based delivery channels.
- The Existing Homes HVAC and Home Performance with ENERGY STAR programs have always been interrelated, and at one point were delivered as a combined program. Now more than ever, the lines between HVAC and Home Performance continue to blur in the marketplace, with many HVAC contractors offering home performance services like duct repair and insulation while many home performance contractors have obtained HVAC licenses. As home energy management technologies continue to emerge and change the residential DSM market, now is an opportune time to combine these programs to take advantage of synergies.
- The portfolio of residential programs will be clearly aligned around distinct residential market segments including Existing Homes, New Homes, Multi-Family and Limited Income (which is served by a distinctly different program delivery channel).

Note that this proposed program design change will not eliminate or modify any of the currently approved measures or delivery channels in each of the current programs. It will simply combine these measures into a single comprehensive program for existing homes that will reduce overhead, streamline program delivery costs, and offer the benefit of simple one-stop shopping convenience for customers and trade allies.

The combined Existing Homes program will include all of the following currently approved DSM measures:

- HVAC Quality Installation
- Duct Test and Repair
- Attic Insulation
- Western Cooling Control
- Smart Thermostats (Energy Efficiency Rebates)
- Online and Onsite Energy Audits

In addition to these current measures, APS is proposing to add:

- Rate Optimized Smart Thermostats (Proposed in 2018 DSM Plan)
- Connected water heater controls pilot (Proposed in 2018 DSM Plan)
- Connected pool pump controls pilot (New proposed pilot for 2020)

More information on each proposed new measures is included below:

Rate Optimized Smart Thermostats

APS is proposing to add a new Smart Thermostat measure into the Residential Existing Homes and Multi-Family Programs. The Smart Thermostat measure is a residential energy management technology that provides energy efficiency savings; Rate Optimized Smart Thermostats will provide additional bill savings for customers who are on TOU and demand based service plans rates by automatically adjusting thermostat operation around the 3-8pm peak demand period to help shift energy use and reduce on-peak energy costs.

This measure is targeted to reach both single family and multifamily residents with an offer for a free smart thermostat that provides multiple features, including a mobile phone app, which helps conveniently manage home energy use. In order to receive the free thermostat, customers must agree to be on an advanced rate plan (residential R2, R3 or TOU-E rates) and participate in the residential APS Cool Rewards smart thermostat demand response program (part of the APS Rewards Energy Storage and Load Management Program) for at least one summer season (June 1-September 30).

The thermostats will come pre-configured to save money by automatically optimizing HVAC operation around APS advanced rate plans and customer preferences, including learning custom parameters for pre-cooling prior to peak demand periods and temperature drift during peak periods to reduce on-peak energy use. Thermostats will be provided free for participating customers who meet program requirements. These thermostats can be self-installed by many customers. APS will provide support for customers who wish to install the thermostats themselves (including links to online video installation guides and a manufacturer install hotline). For customers who do not wish to install themselves, APS will offer a reduced installation cost through participating contractors.

Connected Water Heating Controls

The proposed direct install connected water heater control pilot measure is designed to help shift energy demand off-peak and use excess midday solar energy by controlling the timing of electric water heating. The proposed pilot measure would offer direct installed connected water heater controls for eligible participating customers who receive an on-site Home Performance energy audit. Participating customers must have electric water heating and agree to be on an advanced

rate plan (new TOU or demand rate). The program will be delivered through direct install home performance contractors who will directly install and configure the timers for participating customers.

Advanced controls will be set to control water heating timing to provide energy efficiency savings, and to provide additional energy bill savings for customers on TOU/demand service plans by shifting energy use into off-peak hours. In the early afternoon, water heaters will be timed to turn on and absorb excess solar generation while pre-heating water prior to the late afternoon peak. Timers will be set to turn off water heaters from 3-8pm (for all or most of the on-peak period depending on customer preferences and hot water usage patterns) to reduce peak demand and energy costs. Customers may elect to pay a small fee to upgrade to smart technology that offers additional features including leak detection and mobile phone applications that can remotely monitor and adjust water heater settings.

Connected Pool Pump Controls

APS proposes to add a new pilot measure for connected pool pump controls. These connected controls provide multiple benefits for customers including the ability to remotely monitor and change pump settings, making it easy for customers to save energy by reducing pump times during cooler months of the year. The connected controls also provide customers with an easy way to shift their energy consumption away from on-peak hours and save with modern TOU and demand-based service plans, as well as opportunities for future utility demand response programs to be able to connect and control pumps. Pool pumps can ideal for demand response programs since they are an appliance with usage that can typically be shifted without any lifestyle changes. As long as the pool is filtered sufficiently each day, it does not matter much when the pump operates. Because of this, pool pumps are an ideal energy load to dispatch during midday to absorb excess solar energy – which also helps to circulate pool chemicals during the day when sun is hitting the pool.

APS proposes an average incentive of \$30/qualifying device, with the flexibility to adjust the incentive up or down in response to market conditions, with a maximum not to exceed 75% of the product's incremental cost. APS will continue conducting education and outreach for pool owners and pool service professionals about the benefits of upgrading to variable speed pool pumps and advanced pool controls. APS will work with pool owners and pool professionals to encourage customers on advanced rate plans to shift their pool pumping to off-peak hours to save on-peak energy and demand costs. This includes promoting opportunities to shift pool pump use to midday hours during peak solar production to help address duck curve issues, particularly for customers on TOU rates with winter super off-peak midday price periods.

APS plans to continue all program modifications implemented in 2018-2019, including suspension of the Residential Energy Efficiency Financing Program and rebates for LED lighting and variable speed pool pumps. The suspended measures represent widely adopted technologies with attractive payback periods without the need for incentives. Further, they do not provide significant on-peak energy savings. Instead, the proposed new measures in the program will help promote new energy saving technologies and drive substantial incremental customer benefits.

2. Residential New Construction Program

In 2020, APS will continue with the modified program incentive structure implemented in 2019. This structure better responds to current market conditions and maximizes the value of DSM investments, while also providing more flexibility for participating builders. It also helps manage the program budget amidst strong new construction activity and forecasted record builder program participation. APS intends to continue with the current program incentive design in the 2020 Plan, as follows:

ENERGY STAR® Homes

- a. Builder incentive of \$200/home for meeting current APS ENERGY STAR home program requirements.
- b. Builders are not required to participate in ENERGY STAR incentives to access other incentives in the program. They may choose to participate in other Residential New Construction program measures including EV Pre-Wire and Smart Thermostats without meeting ENERGY STAR requirements.

Smart Thermostats

- a. Builder incentive of \$30/thermostat for installing qualifying connected smart thermostats (up to five thermostats per home can participate in the program).
- b. Builders may qualify for this incentive without participating in ENERGY STAR.

In addition, APS is proposing to add three new pilot measures to the program including EV Ready Pre-Wire, Induction Cooking, and Connected Water Heating. More information about each of these proposed measures is included below.

EV Ready Pre-Wire

APS proposes to add a new pilot measure that will offer an incentive of \$100/home for participating homebuilders who make their homes “EV Ready” by including pre-wiring in their garages to support the future installation of EV charging stations. The objective of this new measure is to improve transportation energy efficiency, to reduce customers overall energy costs, and to reduce air emissions. By including EV ready features in a new home during construction – including pre-wiring and electrical panel capacity – it makes it much easier and less expensive to add an EV charger in the future. Greater use of EVs can save customers vehicle fuel and maintenance costs while also reducing air emissions and promoting a more sustainable form of transportation. In addition, EVs provide a future load shifting opportunity that enables APS to work with customers on managing when and where they charge their vehicles to provide electric system benefits for all customers.

The EV Ready Pre-Wire incentive will be a prescriptive incentive available to all homebuilders (subject to budget availability) regardless of their participation in the APS ENERGY STAR Homes program. In order to qualify for an EV Ready incentive, participating homes must meet all the following criteria:

- Must include a dedicated 240-volt, 40-amp plug-in ready circuit with NEMA 14-50 outlet (or equivalent) in vehicle parking area.
- Installation must meet the requirements of the National Electric Code as well as any applicable local building code requirements.

Connected Water Heating

APS proposes to add a new connected electric water heating pilot measure that will offer incentives of approximately \$200/home to participating homebuilders and associated trade allies (such as water heater suppliers) who install qualifying connected electric hot water heaters in new homes. To encourage builder participation, the proposed builder incentive of approximately \$200/home would be based on the total incremental cost of including connected technology in the water heaters plus a builder incentive of \$25/home for participation. This will enable APS to create high penetrations of connected water heaters within new home communities to provide significant load control capability on these distribution feeders. APS may offer this measure as an upstream incentive paid directly to product manufacturers/distributors to leverage these trade ally partners and reduce the added cost of a connected water heater for participating new homes.

Qualifying water heaters may be standard electric resistance or heat pump water heaters, but they must include communications modules and controls to allow for remote control of temperature settings. These connected water heaters offer opportunities for flattening system load shape and saving homebuyers money on their energy costs by shifting energy use into midday non-summer hours with high levels of solar production. By working with homebuilders to incorporate them in new communities, we can proactively create better load shapes more cost effectively by including these water heaters at the time of construction. Buyers of these homes will also have an opportunity to participate in any future APS demand response programs that involve connected water heating technology.

Induction Cooking

APS proposes to add a new pilot measure that encourages homebuilders to install energy efficient induction cooktops in their new home communities. Induction cooking provides multiple benefits for consumers including being safer, faster, and more efficient than a standard electric cooktop. Induction cooking uses magnetic currents to directly heat pots and pans instead of the cooktop surface, making it energy efficient and safer because the cooktop stays much cooler than other stoves. This efficiency also means that foods and liquids heat up 50% faster on induction cooktops compared to either electric or gas cooktops. In this way, induction cooking offers both direct energy savings due to its improved efficiency as well as potential for substantial indirect energy savings due to HVAC and ventilation fan savings from shorter cook times and less waste heat being added into the home in summer months.

APS is proposing an average homebuilder incentive of \$200 per induction cooktop for this pilot measure with a volume not to exceed 1,000 participating new homes in 2020. This measure does not currently pass the ACC cost effectiveness test, based on the higher cost of induction cooking, but the analysis does not account for all potential benefits including indirect savings from less need for AC, decreased ventilation, and less heat in the home. There are also substantial non-energy benefits when you consider the time savings and health and safety benefits for customers from induction cooking. Proceeding with this pilot measure will allow us to gather more information on this promising technology while saving customer energy costs and improving efficiency for years to come in participating new homes.

3. Residential Conservation Behavior Program

The Conservation Behavior program motivates measurable energy savings by providing home energy reports, emails and online information to participating households. The program shows participants a profile of their current home energy use, how it compares to similar homes, and offers customized tips for saving energy and reducing home energy costs.

APS plans the following program elements for the Conservation Behavior program in 2020:

- The program will be expanded to deliver personalized seasonal Home Energy Reports by email (eHERS) for up to 400,000 participating households, more than double current program participation.
- APS is expanding the use of Home Energy Reports as a tool to help limited income customers learn how their home uses energy and the best ways to save money on their home energy costs. APS will introduce a new Home Energy Report delivered to all APS limited income customers in the APS Energy Support Program that will focus on no/low cost energy savings tips and provide information about assistance programs and other support available.
- In addition to promoting energy efficiency messages, Home Energy Reports will be used to help educate customers and increase awareness of ways to shift energy use and manage peak demand. The reports will also be used to promote other APS energy saving program opportunities and incentives that are available.
- All participating customers can always access the program web portal where they can find additional information, energy education, and customized energy saving tips.
- APS plans to implement a new element of the Conservation Behavior program that will offer a mobile phone app for customers that provides an ongoing breakdown of how their home is using energy based on AMI data. Customers who wish to upgrade can purchase an energy bridge (also called a gateway device), which will provide them with real time feedback of their energy usage and demand. These devices currently retail at approximately \$100 and APS is proposing to offer customer incentives of around 50% of incremental cost, or \$50/household device, with flexibility to adjust incentives up to a maximum of 75% of incremental cost. This pilot measure was originally approved in Decision No. 76313 within the Energy and Demand Education initiative. The technology has now matured, and APS intends to launch the pilot now within the Conservation Behavior program. It is budgeted to reach approximately 60,000 app users and up to 5,000 customers receiving real time information through a gateway device.

4. Residential Multi-Family Energy Efficiency Program

APS is continuing the program modifications implemented in 2018-2019, including removing the program's direct install LEDs, low flow showerheads, and faucet aerators. In their place, APS is proposing one new measure for rate optimized smart thermostats and two new pilot measures including connected water heaters/water heater controls and induction cooking.

The rate optimized smart thermostat measure and connected water heater controls pilot measure are also being proposed in the Residential Existing Homes program and the connected water heaters and induction cooking measures are included in the Residential New Homes program. For a complete description of these new measures, see these two sections of the Plan.

In the Multi-Family program, these measures will be implemented as direct install items and APS will work closely with participating property management companies to have their staff (or contractors they hire) install smart thermostats, connected water heating controls, and other measures in qualifying multi-family properties. APS will track and verify all installations.

5. Residential Limited Income Weatherization Program

This is an important program that provides support for APS residential customers who have the most difficulty affording their energy costs. In accordance with Decision No. 76313, APS has continued increased funding for the Limited Income Weatherization Program that was originally ordered in 2017. In addition, APS intends to increase funding by an additional 50% in 2020 for a total program budget of \$5.5 million.

In 2020, the program will partner with local weatherization agencies and a non-profit multi-family rehabilitation project expert to encourage comprehensive retrofits of limited income multi-family properties. These projects will leverage program funds with capital from building owners and other funding sources to offer added benefits for customers and extend the reach of program funds to improve cost effectiveness. In response to stakeholder input, the program will also target support to reach disadvantaged communities and provide upgrades for multifamily properties where at least the minimum 66% of residents are qualifying limited income customers, but where the program can also help other building tenants who are just above the federal income guidelines. Through this initiative, APS can work with property owners/managers who are willing to make investments that enable Limited Income Program dollars to stretch further and help more customers.

B. NON-RESIDENTIAL PROGRAMS

Proposed Program Modifications

APS proposes the following program updates to non-residential programs in 2020.

1. Add New Prescriptive Energy Efficiency Measures

APS intends to move two cost effective measures (compressed air condensate drains and upgraded receivers) from custom incentives to the list of prescriptive incentives in 2020. These measures have been found to be cost effective across a wide range of commercial applications - by moving them to the prescriptive list, it highlights these measures as potential savings opportunities for APS customers and trade allies, resulting in greater participation and savings. Additionally, it helps reduce APS program delivery costs by saving staff time needed to review custom applications.

In addition, APS is proposing to add three new prescriptive energy efficiency measures into the Existing Facilities program in 2020, including: Data center computer room ACs, ultrasonic humidification, and networked thermostats. These measures were identified as new customer savings opportunities through work with stakeholders in the DSM Collaborative and Integrated Resource Plan working groups. These technologies are currently being deployed in other utility

programs, and APS found them to be cost effective using ACC societal cost test methods – details of these calculations will be provided in workpapers to ACC Staff.

2. Modify Program Structure to Create a Comprehensive Existing Facilities Program

APS is consolidating the Large Existing Facilities and Small Business programs into a single, comprehensive Existing Facilities program for all Non-Residential customers. This streamlines program delivery, reporting and overhead costs, and helps maintain cost effectiveness in the Small Business program segment. This change is largely confined to administration only since it is already marketed to customers as one comprehensive Solutions for Business program. In response to DSM Collaborative input, APS intends to continue to separately track and report on program participation from small business customers in future DSM Annual Progress Reports.

3. Continue Enhanced Savings Opportunities for Schools

The 2020 Plan maintains a separate program for schools, where qualifying schools can access special incentives to support energy efficiency projects including rebates for lighting, refrigeration, and other measures that were removed for other customers in 2018.

4. Add Enhanced Savings Opportunities for Local Community Non-Profit Organizations

The 2020 Plan proposes to add a new Non-Residential program element within the Existing Facilities and New Construction Programs targeted to reach local community non-profit organizations. These qualifying non-profit facilities would be able to access the same list of special incentives available within the Schools program. The objective is to help these community organizations reduce their energy costs through energy efficiency projects, so they can lower their operating expenses and devote more of their resources to helping the community. This program element is anticipated to provide both cost effective energy savings for the program and additional benefits to the community.

In order to qualify for this program element, qualifying organizations must submit documentation of their 501c3 tax designation as proof of their non-profit status. These non-profit facilities will be able to access the same expanded list of incentives as the Schools program, but not within the Schools program itself. The non-profit program element will be separately tracked and recorded within the Non-Residential Existing Facilities and New Construction programs. The Schools program will remain its own separate program to ensure that schools receive all their dedicated DSM funds.

5. Add New Beneficial Electrification Pilot Measures

APS is proposing to add five new beneficial electrification pilot measures within the Non-Residential Existing Facilities and New Construction program including: Standby truck refrigeration, Electric forklifts, Airplane tugs, Airport luggage carts, and Airport luggage conveyors. These measures have a positive Societal Cost Test benefit/cost ratio due to substantial benefits for customers and the environment through reduced air emissions, lower fuel costs, and their ability to help utilize midday solar energy on the grid. The proposed measures are

similar to electrification program measures that are currently being successfully deployed at many utilities nationwide, including SRP. These new measures would be marketed to eligible customers and implemented as part of Solutions for Business program offerings.

- **Standby Truck Refrigeration** - Electric standby truck refrigeration units allow trucks to plug in and use electricity to power their HVAC and/or refrigerated storage while they are docked at a truck stop or distribution facility. They reduce overall fuel costs, significantly lower air emissions from idling diesel truck engines, and they create safer, healthier and less noisy work areas. Standby truck refrigeration units can reduce annual air emissions by up to 13 metric tons - these emissions are largely located in population centers and serve to improve air quality and health. APS proposes to pay an incentive of approximately \$750 per bay for eligible newly installed electric conversion units (electric infrastructure replacing existing electric infrastructure does not qualify for this program). APS may vary the incentive in response to market conditions within a range not to exceed 75% of customer incremental cost.
- **Electric Forklifts** - Electric forklifts can be used as an alternative to conventional forklifts that run on propane or diesel fuel. They can reduce fuel costs by up to 75% and save vehicle maintenance expenses due to having 90% fewer parts than a combustion engine. Use of electric forklifts can save up to 11 metric tons of emissions per propane conversion or six metric tons per diesel conversion. Electric forklifts create safer, healthier, quieter work environments. They can also result in significant additional energy savings because warehouse facilities can reduce the need for fresh air ventilation by removing internal combustion engine forklifts from indoor workspaces. APS proposes to pay an incentive of approximately \$1,250 per electric forklift addition or existing forklift conversion (electric equipment replacing existing electric equipment does not qualify for this program). APS may vary the incentive in response to market conditions within a range not to exceed 75% of customer incremental cost.
- **Airport Electrification** - There are a wide variety of airport operations that can benefit from electrification. Many of these opportunities involve specialized non-highway airport vehicles and other mobile airport equipment such as airport baggage tugs, airplane pushback tugs, and luggage belt loaders. Currently, this equipment is typically being operated using gasoline powered internal combustion engines. Shifting to electricity can reduce energy costs, improve energy efficiency, lower emissions, and create safer, healthier, and quieter work environments. It can also help improve grid efficiency and provide flexible loads to help integrate intermittent renewable generation on the grid. APS proposes average incentives of approximately \$1,100/unit for belt loaders, \$2,500/unit for baggage tugs, and \$5,000/unit for pushback tugs.

6. Updates Requests for EV Charging Pilot Programs in the 2018-2019 Plans

In the 2020 DSM Plan, APS is not incorporating the requests for the School Bus EV Pilot Program and Managed EV Charging programs that were proposed in the 2018 and 2019 DSM Plans.

Instead, APS is proposing to launch a new EV Charging Demand Management pilot program in 2020, to proactively address the growing electric demand from EV charging as EVs become

more widely adopted (*see* Attachment 1 for more information). APS has a pilot program for EV charging infrastructure being implemented outside DSM.

7. Continue Program Changes Implemented in 2018-2019

APS intends to continue the program modifications that were implemented in 2018-2019 including removal of the Self Direction program, the Commercial Energy Efficient Financing program, and modifications to measures within the Non-Residential Existing Facilities and New Construction programs.

8. Focus on Customer Education, Technical Assistance and Trade Ally Training

APS has included funding in the 2020 DSM Plan to support enhanced education, training and technical assistance support for Non-Residential customers and trade ally contractors who deliver energy services to this sector. This includes providing support for DSM measures where APS is currently offering incentives, but more importantly, it also includes technical support for DSM measures where incentives may not be offered, such as commercial lighting. Although these measures may not qualify for utility incentives, APS can still play an important role as trusted energy advisor for customers with unbiased information to help them plan DSM projects. This includes information such as technology considerations, savings calculations, anticipated project payback times, and assistance with tracking ongoing energy savings.

Specific program elements currently planned in this area for 2020 include:

- *Enhanced trade ally training with an online learning platform.* APS plans to launch an electronic learning management system that will provide on-demand training to trade allies on DSM technical topics, track the completion of the training, and allow for messaging related to the program. This will improve participating contractor knowledge and communications within a platform that makes it easier for trade allies to attend training when it fits their schedule. The objective is to engage trade allies to better support program initiatives and provide knowledge to help customers make better energy-related decisions through a mix of on-demand, in-person and webinar training, trade ally outreach, and technical sales support tools. Included in the training will also be background content to help improve trade ally understanding of underlying resource challenges and how to shift energy use to address system peak demand and duck curve load shape issues.
- *Online and onsite customer facility energy assessments.* APS will continue marketing the online Business Energy Analyzer web tool, which is available free at aps.com for APS commercial customers to conduct an online energy assessment of their facility. The audits can be calibrated with their actual energy usage history to provide customized energy savings recommendations. In addition, APS will offer a limited number of on-site commercial facility assessments which will be targeted to high potential facilities as well as offered to qualifying non-residential customers on a first come, first serve basis. The assessments will include an engineering walk through of facilities to look for opportunities for energy efficiency, load shifting, storage, reducing peak demand, and potential savings opportunities from moving to a commercial TOU rate where applicable. APS will continue and expand on this successful initiative that was started in 2019, with a goal to conduct up to 300 on-site facility energy audits in 2020.

9. **Modify Custom, Whole Building and Retro-Commissioning Incentives**

APS intends to modify the incentive design for the Custom, Whole Building and Retro-Commissioning measures in 2020, updating the designs that were proposed in the 2018 DSM Plan. The new design provides a small incentive for energy efficiency savings at any time of the year, with a significantly increased incentive applied to on-peak summer energy savings.

The custom incentive design for these measures for the 2020 DSM Plan is as follows:

- An incentive of \$0.02/kWh will be offered for qualifying custom energy efficiency projects based on estimated first year annual kWh energy savings.
- On qualifying projects, a bonus incentive of \$0.18/kWh will be offered for all first-year savings that occur during summer on-peak hours from 3-8pm on weekdays from June 1 through September 30 (as calculated and confirmed by APS energy modeling).
- All other rules and requirements for the Custom incentive program remain in effect.

C. DEMAND SIDE MANAGEMENT INITIATIVES

1. Demand Response

APS proposes to continue its current demand response and load management programs including the APS Peak Solutions® program, Peak Event Pricing, and Time-of-Use Rates.

APS is currently implementing the Demand Response, Energy Storage and Load Management (DRESLM) initiative, now being marketed as “Rewards,” pursuant to Decision Nos. 76313 and 76314. The initiative is designed to facilitate demand response, peak demand management and load shifting technologies including smart thermostats, connected water heaters, and battery storage. As noted in Table 1, APS intends to fund 2020 Rewards program activities using a combination of \$1,928,000 in currently collected funds that are remaining in the original budget for technology deployment and additional program funding of \$4,667,862 to support ongoing program implementation and increased customer participation in Cool Rewards, including annual customer incentives paid to participants. APS is expanding the participation goal for the Cool Rewards smart thermostat demand response initiative to 40,000 thermostats (more than double current participation). These participants are expected to provide an estimated 52 MW of demand response peak capacity in the 2020 Plan.

In order to meet increased program participation goals in 2020, APS intends to increase the enrollment incentive from \$25 to \$50 for new program participants who sign up for the Cool Rewards program for the first time. This is equal to the current SRP program and is a typical enrollment incentive used in many smart thermostat demand response programs nationwide. The annual participation incentive of \$25/year earned by program participants who remain in the program through each summer season will remain unchanged in 2020.

APS has gained experience working with customers in the Cool Rewards program over part of the 2018 summer season and all of the 2019 season. During this time period, customer satisfaction and the retention rate in the program has been high, and customer overrides of thermostat events are lower than the national average. Based on this experience and a review of

demand response program best practices nationwide, APS intends to make program modifications to Cool Rewards in 2020 which will be clearly communicated to all participating customers including:

- The temperature range for events may be up to 3 degrees of pre-cooling and/or thermostat setback for standard events and up to a maximum of 4 degrees setback for a limited number of high priority events each year.
- The time period of thermostat temperature setback during demand response events for any individual participating thermostat may be up to 3 hours.
- Customer notice of events will be provided not less than 2 hours in advance of an event or 15 minutes for a limited number of high priority events. Customers will always maintain the ability to override any event by manually adjusting their thermostat settings.
- APS intends to expand Cool Rewards eligibility to include qualifying small business customers in the program. Small business customers will receive the same incentives as residential customers for each participating smart thermostat they enroll in the program.

APS is proposing to launch the new reverse demand response pilot initiative in 2020 that was originally proposed in the 2018 DSM Plan. This pilot will work with qualifying non-residential facilities to identify opportunities for dispatching loads in response to negative pricing events. This pilot directly addresses the resource needs highlighted earlier in this document and invites customers to work with APS to find innovative ways to benefit themselves as well as contribute to lowering rates for all APS customers. Customers would identify beneficial but non-essential loads that could be operated in response to an event signal. These loads would be sub-metered and provided with no-cost energy during these event periods. This pilot provides load flexibility to help address duck curve challenges and reduce the need to curtail solar during periods of negative pricing, responsiveness that puts a downward pressure on all customer rates. To be eligible for the program, the dispatchable customer load must have a demand of at least 30 kW.

As part of the pilot costs, APS would provide the sub-metering and communications infrastructure needed at the facility to enable calling reverse DR events. There would be no ongoing incentive for participation, but customers will receive the benefits of free energy during reverse DR event periods. APS proposes to limit the pilot to no more than \$200,000 in total spending in 2020, and to report on the program results and benefits in the DSM Annual Progress Report.

2. 2020 System Savings Projects

APS proposes the following System Savings Projects in 2020:

- Operation of Conservation Voltage Reduction systems on an estimated 12 distribution feeders throughout the APS service territory in 2020; and
- Energy efficiency upgrades to APS facilities that are included in the Solutions for Business program, including measures such as installation of new Energy Management System controls, new higher efficiency HVAC air handlers, package HVAC unit replacements, and installation of variable frequency drives.

APS intends to count towards the EES, an estimated 5,200 MWhs of annual energy savings from APS System Savings projects in 2020.

3. Building Codes and Appliance Standards

The Building Codes and Appliance Standards (C&S) Initiative encourages energy savings by supporting better compliance with energy codes and appliance standards in jurisdictions throughout the APS service area by working with code officials, building professionals and other market actors to develop strategies for achieving better code compliance more cost effectively. In 2020, APS intends to continue and expand current program efforts supporting codes and standards related savings, including codes training and technical assistance support for local communities. APS estimates approximately 27,000 MWhs of savings from the Energy Codes and Appliance Standards initiative in 2020.

4. Energy and Demand Management Education

This program was approved in Decision No. 76313.

Energy usage information tools and resources can provide customers with enhanced feedback to help better manage their energy use and demand. These tools can help educate customers about the ways that they use energy and point out opportunities for savings. The result is a more informed consumer who better understands how to manage their energy use and demand, improve efficiency and save energy costs.

The program will introduce new energy information tools including web-based energy and demand analyzers to help customers manage their usage. APS plans to continue ongoing support and enhancements to these customer educational tools for residential and non-residential customers.

A key objective will be to measure the energy efficiency savings that result from behavioral changes in energy use that occur when customers receive enhanced energy information. This is in accordance with A.A.C. R14-2-2412(F) of the Arizona Energy Efficiency Rules (EE Rules) which states that, “educational programs shall be analyzed for cost effectiveness based on estimated energy and peak demand savings resulting from increased awareness about energy use and opportunities for saving energy.” The data gathered from the program will be used to inform future planning efforts.

In the 2020 DSM Plan, APS intends to increase funding for this program. Among other efforts, the program budget in 2020 is expected to support the following:

- A new online marketplace that helps link APS customers with information to help purchase the most energy efficient appliances, get instant rebates from APS on energy efficiency technologies like smart thermostats, and link to APS programs and energy services. APS intends to work with third party evaluators to measure and report savings from this program that result from customers purchasing more efficient appliances through the marketplace.
- A community outreach field team that works directly with customers to educate them about saving energy at home and ways that APS programs that can help. The field team provides support for customers at home shows, retail outlets, community events, limited income focused events and other opportunities for direct customer outreach and education.

- Customized online tools for customers that provide breakdowns of where they are using energy and the best opportunities to save based on their usage profile, including the Home and Business Energy Analyzer tools.
- Funding for education and marketing campaigns that promote energy efficiency, demand response, energy management, and ways to save on home energy costs.

5. Transmission & Distribution Pilot

APS is proposing to consolidate the Transmission and Distribution Pilot into the Energy Storage and Load Management (Rewards) Initiative. The Transmission and Distribution pilot was originally included in the APS 2017 DSM Plan as a pilot funded outside of DSM to provide information on benefits from improved system operations that may be gained by targeting demand side management opportunities at the substation level. Subsequently, APS launched the Energy Storage and Load Management (Rewards) initiative, which is being targeted at the feeder/substation level. This initiative has become the Transmission and Distribution pilot, so a separate program is no longer needed.

6. Load Management Technologies Pilot

The Load Management Technologies Pilot was originally included in the APS 2017 DSM Plan as a pilot initiative funded outside of DSM seeking to deploy commercially available load control and load shifting technologies for residential and non-residential customers. APS is consolidating this pilot into the Energy Storage and Load Management (Rewards) initiative that will leverage the technology learnings gained from the pilot.

V. Budget

A. DSM BUDGET

Table 1 below shows the anticipated 2020 DSM spending by program. The budget in this Plan represents the estimated spending required to meet the estimated 2020 DSM savings of 263 MW and 707,000 MWhs. These projections are based on APS's best estimates of market penetration and customer demand for each program measure. The table includes the anticipated budget by program, broken down by spending category.

Table 1
Estimated 2020 DSM Spending by Program*

Program	Rebates and Incentives (\$)	Implementation (\$)	Marketing (\$)	Planning and Administration (\$)	Training & Technical Assistance (\$)	Consumer Education (\$)	Financing (\$)	Total Program Cost (\$)
RESIDENTIAL								
Existing Homes	\$4,894,699	\$1,280,500	\$225,000	\$399,288	\$445,000	\$0	\$0	\$7,244,487
Residential New Construction	\$2,450,000	\$625,000	\$80,000	\$190,000	\$25,000	\$20,000	\$0	\$3,390,000
Multi-Family Energy Efficiency	\$1,247,500	\$253,719	\$5,000	\$130,000	\$190,000	\$227,000	\$0	\$2,053,219
Limited Income Weatherization	\$4,554,000	\$305,000	\$0	\$240,000	\$51,000	\$350,000	\$0	\$5,500,000
Conservation Behavior	\$599,950	\$1,220,000	\$0	\$80,000	\$0	\$0	\$0	\$1,899,950
Totals for Residential	\$13,746,149	\$3,684,219	\$310,000	\$1,039,288	\$711,000	\$597,000	\$0	\$20,087,656
NON-RESIDENTIAL								
Existing Facilities	\$5,533,278	\$2,008,176	\$200,000	\$375,500	\$900,000	\$150,000	\$0	\$9,166,954
New Construction and Major Renovation	\$722,505	\$435,617	\$20,000	\$58,150	\$45,000	\$0	\$0	\$1,281,272
Energy Information Services	\$112,800	\$223,500	\$10,000	\$6,000	\$15,000	\$0	\$0	\$367,300
Schools	\$1,020,447	\$470,000	\$30,000	\$50,000	\$60,000	\$35,000	\$0	\$1,665,447
Totals for Non-Residential	\$7,389,030	\$3,137,293	\$260,000	\$489,650	\$1,020,000	\$185,000	\$0	\$12,480,973
DEMAND SIDE MANAGEMENT INITIATIVES								
Demand Response	\$0	\$2,070,000	\$0	\$230,000	\$0	\$0	\$0	\$2,300,000
Energy Storage and Load Management ("Rewards")	\$3,800,000	\$2,495,862	\$50,000	\$250,000	\$0	\$0	\$0	\$6,595,862
Building Code and Appliance Standards	\$0	\$80,000	\$0	\$20,000	\$100,000	\$0	\$0	\$200,000
APS System Savings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
EV Charging Demand Management	\$62,500	\$200,000	\$5,000	\$20,000	\$0	\$0	\$0	\$287,500
Subscription Rates Pilot Study	\$0	\$1,500,000	\$0	\$0	\$0	\$0	\$0	\$1,500,000
Energy and Demand Education	\$0	\$414,959	\$0	\$310,000	\$200,000	\$4,345,050	\$0	\$5,270,009
Totals for DSM Initiatives	\$3,862,500	\$6,760,821	\$55,000	\$830,000	\$300,000	\$4,345,050	\$0	\$16,153,371
Segment Totals	\$24,997,679	\$13,582,333	\$625,000	\$2,358,938	\$2,031,000	\$5,127,050	\$0	\$48,722,000

Program Costs	\$48,722,000
Measure, Eval and Research	\$3,206,000
TOTAL	\$51,928,000

*Includes a total of \$30,000,000 proposed to be funded from the DSMAC balance account, \$20,000,000 to be funded through base rates in accordance with Decision No. 76295, and \$1,928,000 in funding for the Rewards program from collected but unspent program funds.

B. DEMAND SIDE MANAGEMENT ADJUSTMENT CHARGE

APS is proposing to reduce the current DSMAC charges approved in Decision No. 76313, which are currently set at \$0.000982 per kWh and \$0.353 per kW. APS proposes to use \$31,928,000 in collected but unspent funds in the DSMAC balance account to fund 2020 DSM programs, so that the proposed new DSMAC charge would be \$0.000 per kWh and \$0.00 per kW. Table 2 below shows the 2020 revenue requirements for the DSMAC.

In accordance with Decision No. 76313, APS is funding the Energy Storage and Load Management (Rewards) initiative with collected, but unspent funds, from the DSMAC balancing account. In 2020, the total of \$1,928,000 in remaining funds originally earmarked for this program will be used to fund remaining energy storage and load management technology installations.

Table 2
2020 Revenue Requirements for DSMAC

Total 2020 DSM Budget	\$51,928,000
Amount Recovered in Base Rates	(\$20,000,000)
Collected but Unspent Funds	(\$31,928,000)*
Subtotal	\$000,000
Less Gain on Sale of Assets Balance	(\$0)
Total Revenue Requirement for 2020 DSMAC	\$0

*From the DSMAC Balancing Account.

C. PERFORMANCE INCENTIVE

Although the 2020 DSM Plan achieves compliance with the Energy Efficiency Standard, APS is not requesting a performance incentive as part of the 2020 DSM plan in order to focus all funds on customer programs.

VI. DSM Energy Savings and Benefits

Table 3 below provides details of the expected annual and lifetime energy savings and peak demand reductions from each DSM program and initiative, and a summary of the net benefits generated for 2020. These are in addition to energy savings, costs and net benefits associated with APS DSM activities undertaken during the 2005 through 2019 timeframe, which are reported each year in APS's Semi-Annual DSM Report filings. The lifetime energy savings are the estimated savings that will result over the expected lifetime of all program measures installed in 2020. Note that the current construct for measuring DSM net benefits requires use of the societal cost test. This test was developed for energy efficiency programs and as such it is not currently designed to capture all of the benefits of emerging load shifting and electrification measures. APS will work to evaluate the results of these pilots and provide a report of program costs and net benefits in the DSM Annual Progress Report.

Table 3
2020 DSM Savings and Benefits

Program	Annual Coincident Demand Savings at Generator (MW)	Annual Savings at Generator (MWh)	Lifetime Energy Savings (MWh)	Cost Test Benefits (\$)	Cost Test Costs (\$)	Lifetime Net Benefits (\$)
RESIDENTIAL						
Existing Homes	71.6	24,560	270,600	13,275,277	12,771,172	504,105
Residential New Construction	12.8	18,311	356,911	12,757,222	12,348,877	408,346
Multi-Family Energy Efficiency	3.9	7,144	127,869	3,153,012	2,837,735	315,277
Limited Income Weatherization	1.8	3,551	63,912	946,608	946,608	0
Conservation Behavior	36.3	71,615	71,615	1,453,971	1,383,057	70,914
Totals for Residential	126.3	125,181	890,907	31,586,091	30,287,449	1,298,642
NON-RESIDENTIAL						
Existing Facilities	21.7	80,158	1,233,240	28,939,031	22,999,723	5,939,309
New Construction and Major Renovation	2.6	7,831	132,200	3,074,646	2,889,267	185,380
Energy Information Services	1.5	6,740	33,701	798,132	669,224	128,907
Schools	2.8	11,755	203,980	4,649,713	3,572,191	1,077,522
Totals for Non-Residential	28.6	106,485	1,603,121	37,461,522	30,130,405	7,331,118
DEMAND SIDE MANAGEMENT INITIATIVES						
Demand Response	25.0	109,500	116,618	0	0	0
Energy Storage and Load Management ("Rewards")	76.2	333,754	6,822	0	0	0
Building Code and Appliance Standards	7.2	26,629	226,021	0	0	0
APS System Savings	0.0	5,160	77,395	0	0	0
EV Charging Demand Management	0.0	0	0	0	0	0
Subscription Rates Pilot Study	0.0	0	0	0	0	0
Energy and Demand Education	0.0	0	0	0	0	0
Totals for Demand Side Management Initiatives	108.4	475,043	426,855	0	0	0
TOTAL	263.2	706,708	2,920,883	69,047,614	60,417,854	8,629,760

Appendix A

Appendix A
Description of Previously Approved DSM Programs

RESIDENTIAL PROGRAMS

1. Consumer Products Program

The primary target market for the Consumer Products program is APS residential customers who are contemplating the purchase of energy-using products for their homes. The program provides customers with education and incentives to purchase consumer products that use less energy. APS implements the program through participating retailers and trade allies within the APS service territory.

The smart thermostat element of the program promotes qualifying energy efficient smart thermostats with advanced features such as remote thermostat operation through mobile apps as well as demand response capabilities. The program provides incentives for customers who purchase qualifying thermostats and enroll their thermostats in the program.

APS has combined this program into the comprehensive Existing Homes program in the 2020 DSM Plan.

2. Existing Homes HVAC Program

The Residential Existing Homes Heating, Ventilation, and Air Conditioning (HVAC) program uses a combination of financial incentives, contractor training and consumer education to promote the proper installation and maintenance of energy efficient HVAC systems. The air conditioner (AC) Quality Installation, Duct Test and Repair, HVAC Diagnostics and Western Cooling Control measures support energy efficient residential air conditioning and heating systems along with the proper installation, maintenance and repair of these systems. The program also provides APS customers with referrals to contractors who meet strict program requirements for professional standards, technician training and customer satisfaction.

In the 2018-2019 DSM Plans, APS proposed including TOU/Demand optimized smart thermostats as a new measure in this program.

APS has combined this program into the comprehensive Existing Homes program in the 2020 DSM Plan.

3. Home Performance with ENERGY STAR Program

The Home Performance with ENERGY STAR® (HPwES) program promotes a whole house approach to energy efficiency by offering incentives for improvements to the building envelope and energy using devices in existing residential homes within the APS service territory. The current program includes measures to improve the energy efficiency of the home such as air sealing, insulation, and duct sealing. It also educates customers about how their homes use energy and ways to save energy. The program supports online and on-site energy audits that help APS residential customers identify the best opportunities for saving energy in their homes. To perform on-site energy audits, the HPwES program provides APS customers with referrals to specially credentialed contractors who meet strict program requirements for professional standards, technician training, and customer satisfaction.

Appendix A

Description of Previously Approved DSM Programs

In the 2018-2019 DSM Plans, APS proposed to include TOU/demand optimized smart thermostats and smart water heater controls as new/pilot measures in this program.

APS has combined this program into the comprehensive Existing Homes program in the 2020 DSM Plan.

4. Residential New Construction Program

The Residential New Construction program promotes high efficiency construction practices for new homes. It offers incentives to builders that build to the program's stringent energy efficiency standards. The program is based on the EPA ENERGY STAR V3 new homes certification, and also includes additional energy efficiency requirements. The program emphasizes the "whole building" approach to improving efficiency and includes field testing of homes to ensure compliance with APS program standards. Participating builders are trained to apply building science principles to achieve performance levels, and the program also provides education for prospective homebuyers about the benefits of choosing an energy efficient new home and the features to consider.

In the 2018-2019 DSM Plans, APS proposed adding "EV Ready" as a new measure in the program to encourage builders to install pre-wiring to accommodate future installation of EV charging stations.

5. Limited Income Weatherization Program

APS's Energy Wise Limited Income Weatherization (LIW) Program is designed to improve the energy efficiency, safety, and health attributes of homes occupied by customers whose income falls within 200% of the Federal Poverty Guidelines (FPG). The weatherization component of this program serves low income customers with various home improvement measures, including cooling system repair and replacement, insulation, sunscreens, water heaters, window repairs and improvements, as well as other general household repairs. Non-profit agencies and municipal entities owning and operating low income multifamily housing are also able to benefit from funds set-aside to weatherize their complexes. In addition, there is a Crisis Bill Assistance component serving customers whose income falls below 150% of the FPG. These programs elements are administered by various community action agencies throughout APS's service territory.

6. Conservation Behavior Program

The Residential Conservation Behavior program provides participating residential customers with periodic reports containing information designed to motivate them to adopt energy conservation behaviors. To drive conservation behavior, the program provides direct-mailed and/or email and online reports to participants that show how the energy usage in their homes compares with energy efficient homes and other similar homes. In addition to providing these benchmarks, the reports also highlight energy efficiency measures and actions that participants can take to improve the energy efficiency of their homes. These tips serve as an energy conservation idea list and education tool to encourage behavioral changes. Participants are also encouraged to visit a program web portal for additional information.

Appendix A

Description of Previously Approved DSM Programs

7. Multi-Family Energy Efficiency Program

The Multifamily Energy Efficiency Program (MEEP) seeks to improve the efficiency of multifamily properties and dormitories by using a comprehensive two-track approach designed to target existing and new construction multifamily buildings.

The first track targets existing multifamily properties by providing retrofit items to be installed in each dwelling in a community. These measures are provided at no cost to the multifamily community, but must be installed by the facility personnel. In addition, this track works through the Non-Residential APS Solutions for Business program to provide energy assessments to identify additional energy saving opportunities and available APS rebates within the multifamily complex but outside of the individual dwelling units (e.g. common area buildings, swimming pools, outdoor lighting, and laundries). The second track is a new construction/major renovation program that offers a per dwelling incentive for projects that build or renovate to a higher level of efficiency. Incentives increase as a higher level of efficiency is achieved.

In the 2018-2019 DSM Plans, APS proposed adding TOU/demand optimized smart thermostats and water heater controls as new/pilot measures in the program.

NON-RESIDENTIAL PROGRAMS

1. Large Existing Facilities Program

This program provides prescriptive incentives to owners and operators of large Non-Residential facilities for EE improvements in lighting, HVAC, motors, building envelope, and refrigeration measures. Custom incentives are also provided for EE measures not covered by the prescriptive incentives. The primary targets for the Non-Residential Existing Facilities program are customers who have an aggregated monthly peak demand greater than 100 kW. Incentives are also provided to customers who conduct qualifying energy studies.

APS has combined this program into the comprehensive “Existing Facilities” program in the 2020 DSM Plan.

2. New Construction and Renovation Program

The Non-Residential New Construction program includes three components: 1) design assistance; 2) prescriptive measures; and 3) custom efficiency measures. Design assistance involves efforts to integrate energy-efficiency into a customer’s design process to influence equipment/systems selection and specification as early in the design process as possible. Prescriptive and custom incentives are available for EE improvements in measures such as lighting, HVAC, motors, building envelope, and refrigeration applications. Whole Building Design is a component within the New Construction custom efficiency measures that influences customers, developers, and design professionals to design, build and invest in higher performing buildings through a stepped performance incentive structure with the financial incentives becoming larger as the building performance improves. The APS Whole Building Design incentives are designed to complement the Leadership in Energy and Environmental Design

Appendix A

Description of Previously Approved DSM Programs

(LEED) green building certification system which was developed by the United States Green Building Council.

3. Small Business Program

The primary targets for the Small Business Program are Non-Residential customers that have a maximum peak aggregated demand of 100 kW or less. This program provides prescriptive incentives to small business owners for EE improvements in lighting, HVAC, motors, building envelope, and refrigeration applications through a simple and straightforward mechanism. In addition, a customer in the Small Business Program may participate in the Direct Install (Direct Install can pay up to 90% of project cost) family of measures in the areas of lighting and refrigeration and may also qualify to receive APS arranged program financing for their EE projects. Small Business customers are also eligible to receive incentives for energy studies and custom efficiency measures.

In the 2020 DSM Plan, APS has combined this program with the Large Existing Facilities program to create a comprehensive Existing Facilities program.

4. Schools Program

This program is designed to set aside funding for K-12 school buildings, including public schools, private schools, and charter schools. If schools fully subscribe this program budget or if they reach their incentive cap of \$100,000 per year under this program, they can participate in other Non-Residential programs. EE incentives are the same as the Large Existing Facilities (for existing school facilities) and New Construction (for new school construction and major renovations). In addition, any size school may participate in the Direct Install measure incentives and may also qualify to receive APS arranged program financing for their EE projects.

5. Energy Information Services Program

The Energy Information Services (EIS) program provides segmented 15-minute interval electric usage data to large non-residential customers through a web-based energy information tool. This tool provides users with information that can be used to improve or monitor energy usage patterns, reduce energy use, reduce demands during on-peak periods, and to better manage their overall energy operations.

DEMAND SIDE MANAGEMENT INITIATIVES

1. Codes and Standards Initiative

The Energy Codes and Appliance Standards (C&S) Initiative encourages energy savings by supporting better compliance with energy codes and appliance standards in jurisdictions throughout the APS service area by working with code officials, building professionals and other market actors to develop strategies for achieving better code compliance more cost effectively.

Appendix A

Description of Previously Approved DSM Programs

2. Demand Response Programs

APS currently implements several demand response programs and rates. These include the Peak Solutions non-residential demand response program, Critical Peak Pricing rates, and Time of Use rates.

In 2018, APS launched the Demand Response, Energy Storage and Load Management (DRESLM) initiative which is marketed to customers as 'Rewards.' The initiative supports the deployment of residential load management, demand response and energy storage technologies that help APS residential and non-residential customers shift energy use and manage peak demand while also providing system peak reduction and other grid operational benefits. The program includes three elements: battery storage, thermal storage and demand response. The program focuses on optimizing the potential benefits of these technologies in helping customers manage peak demand while meeting APS's flexible resource needs.

3. APS System Savings Initiative

APS system savings projects include, but are not limited to, APS generation, transmission, distribution, and facilities energy efficiency improvements. This includes projects such as installing Conservation Voltage Reduction systems on selected distribution feeders to provide customer energy efficiency savings. APS system savings projects also include many of the same types of energy savings measures as those that are being installed at customer sited facilities – but implemented at APS facilities.

4. Transmission and Distribution ('T&D') Pilot

The T&D pilot was included in the 2017 DSM Implementation Plan. It deploys previously approved measures that have been found to be cost effective by ACC Staff, but the pilot attempts to enhance the benefits that these measures provide by targeting them to areas where they have the most potential value in helping to reduce or defer T&D infrastructure costs.

In the 2020 DSM Plan, APS has consolidated this pilot into the Rewards Energy Storage and Load Management initiative, which includes elements targeted to help specific APS distribution system feeders.

5. Load Management Technology Pilot

The Load Management Technology pilot seeks to deploy commercially available load control and load shifting technologies for residential and non-residential customers to understand the potential benefits of these technologies in meeting APS' flexible resource needs.

In the 2020 DSM Plan, APS has consolidated this pilot into the Rewards Energy Storage and Load Management initiative which is deploying load shifting technologies including battery storage, thermal storage, and smart thermostat enabled pre-cooling and demand response.

Appendix A
Description of Previously Approved DSM Programs

6. Energy and Demand Education Initiative

The Energy and Demand Education initiative includes multiple channels for delivering energy and demand management education to APS customers including web based energy and demand analyzers, personalized outreach, and social media. These tools and resources provide customers with enhanced information about their energy use, resulting in a more informed consumer who better understands how to manage their demand and energy use, improve efficiency, and save energy costs.

Appendix B

Appendix B
Load Shape of Energy Savings from DSM Measures

Program Name	Measure Name	2020 Participation	Per-unit Savings at Generator (kWh/unit)	Total Savings in Each Period Across All Units				Percent of Net Load Shift Occurring in Each Period		
				3-8pm Weekdays All Year	10am-2pm Weekdays October-April	Remaining Load	Total Saved	3-8pm Weekdays All Year (14% of Hours/Year)	10-2pm Weekdays October-April (7% of Hours/Year)	Remaining Hours (79% of Hours/Year)
APS System Savings	CVR	12	429,974	1,053,462	356,535	3,736,091	5,146,088	20%	7%	73%
Building Code and Appliance Standards	ASHRAE Commercial Building Code	1	1,341,718	306,167	148,885	886,666	1,341,718	23%	11%	66%
Building Code and Appliance Standards	Electric Motors EPCAT Standard	1	1,113,667	247,918	120,488	745,261	1,113,667	22%	11%	67%
Building Code and Appliance Standards	General Service Lamps EISA Standard	1	14,806,282	3,142,449	2,698,010	8,965,823	14,806,282	21%	18%	61%
Building Code and Appliance Standards	HVAC 13 to 14 SEER	1	1,969,621	525,523	156,873	1,287,225	1,969,621	27%	8%	65%
Building Code and Appliance Standards	Linear Fluorescent DOE Standard	1	6,109,099	1,296,580	1,113,204	3,699,315	6,109,099	21%	18%	61%
Existing Homes	Smart Thermostats	40,000	89	6,245,742	151,884	2,872,902	9,270,529	67%	2%	31%
Residential New Construction	Smart Thermostats	10,000	89	1,751,164	42,231	784,743	2,578,138	68%	2%	30%
Existing Homes	Duct Test and Repair	3,900	945	1,108,628	89,179	2,485,787	3,683,594	30%	2%	67%
Residential New Construction	ENERGY STAR v3	8,000	2,171	5,490,940	553,352	11,302,786	17,347,077	32%	3%	65%
Existing Homes	Giveaway LEDs	30,000	45	277,108	85,700	987,283	1,350,090	21%	6%	73%
Conservation Behavior	eHERS	400,000	156	16,346,113	3,256,773	42,912,615	62,515,500	26%	5%	69%
Limited Income Weatherization	Home Weatherization Upgrades	828	4,288	978,405	184,974	2,437,295	3,550,674	26%	5%	69%
Existing Homes	AC Quality Installation	5,200	1,201	1,880,079	151,235	4,215,550	6,246,864	30%	2%	67%
Multi-Family Energy Efficiency	AC Quality Installation	2,000	798	480,448	38,648	1,077,269	1,596,364	30%	2%	67%
Existing Homes	Home Energy Analyzer	48,000	132	20,364,563	12,484	7,253,887	27,630,935	74%	0%	26%
Conservation Behavior	Real Time Feedback App	65,000	140	2,379,147	474,017	6,245,854	9,099,018	26%	5%	69%
Existing Homes	Residential Western Cooling Controls	200	649	39,055	3,142	87,570	129,766	30%	2%	67%
Multi-Family Energy Efficiency	New Construction Builder Option Package	1,600	1,862	755,489	179,309	2,043,868	2,978,666	25%	6%	69%
Existing Homes	Attic Insulation Only(R7 to R43)	1,150	2,224	643,095	150,606	1,763,644	2,557,345	25%	6%	69%
Building Code and Appliance Standards	IECC Residential Code	1	1,288,948	337,025	67,148	884,775	1,288,948	26%	5%	69%
Multi-Family Energy Efficiency	Leave Behind Smart Thermostats	2,000	89	531,219	8,139	20,255	559,613	95%	1%	4%
Existing Homes	Leave Behind Smart Thermostats	3,000	89	1,009,488	14,818	10,774	1,035,080	98%	1%	1%
Existing Homes	In-Storage LEDs 2020	1	338,990	69,626	21,533	248,065	339,224	21%	6%	73%
Existing Homes	Low Flow Showerheads	1,400	75	25,677	12,670	67,173	105,520	24%	12%	64%
Energy Information Services	Energy Information Services	300	22,467	1,538,041	747,932	4,454,200	6,740,172	23%	11%	66%
Existing Facilities	Lighting Outdoor Lighting LED Watts <= 50	1,000	651	74,354	0	576,170	650,524	11%	0%	89%
Existing Facilities	Lighting Outdoor Lighting LED Watts >50 & <300	200	1,805	41,257	0	319,699	360,955	11%	0%	89%
Existing Facilities	Lighting Outdoor Lighting LED Watts >= 300	20	3,756	8,587	0	66,538	75,125	11%	0%	89%
Existing Facilities	Interior Lighting T12/T8 Delamping 4-foot lamp	2,571	97	52,966	45,475	151,119	249,559	21%	18%	61%
Existing Facilities	Interior Lighting Exit Sign Retrofit Exit Signs (Elec	50	304	2,606	1,254	11,339	15,199	17%	8%	75%
Existing Facilities	Interior Lighting Exit Sign Retrofit Exit Signs (LED	50	266	2,283	1,099	9,934	13,316	17%	8%	75%
Existing Facilities	Interior Lighting LED Lighting LED Lamps NO Refle	13,635	161	466,442	400,473	1,330,822	2,197,737	21%	18%	61%
Existing Facilities	Interior Lighting LED Lighting MR-16 LED Lamps	3,000	145	92,294	79,241	263,328	434,863	21%	18%	61%
Existing Facilities	Interior Lighting Linear LED 2-foot lamp	12,000	28	70,486	60,517	201,105	332,107	21%	18%	61%
Existing Facilities	Interior Lighting Linear LED 3-foot lamp	1,500	59	18,818	16,157	53,691	88,666	21%	18%	61%
Existing Facilities	Interior Lighting Linear LED 4-foot lamp	200,000	56	2,387,119	2,049,506	6,810,767	11,247,392	21%	18%	61%

Appendix B
Load Shape of Energy Savings from DSM Measures

Program Name	Measure Name	2020 Participation	Per-unit Savings at Generator (kWh/unit)	Total Savings in Each Period Across All Units				Percent of Net Load Shift Occurring in Each Period		
				3-8pm Weekdays All Year	10am-2pm Weekdays October-April	Remaining Load	Total Saved	3-8pm Weekdays All Year (14% of Hours/Year)	10-2pm Weekdays October-April (7% of Hours/Year)	Remaining Hours (79% of Hours/Year)
Existing Facilities	Interior Lighting Linear LED 8-foot lamp	4,160	75	66,583	57,166	189,971	313,720	21%	18%	61%
Existing Facilities	HVAC Packaged AC < 65 kBTU/h TIER 1	200	29	1,569	468	3,844	5,881	27%	8%	65%
Existing Facilities	HVAC Packaged AC < 65 kBTU/h TIER 2	500	40	5,382	1,607	13,183	20,172	27%	8%	65%
Existing Facilities	HVAC Packaged AC <= 65 kBTU/h Advanced TIER	250	54	3,630	1,084	8,892	13,606	27%	8%	65%
Existing Facilities	HVAC Packaged AC >= 135 and < 240 kBTU/h Advan	120	84	2,702	807	6,619	10,128	27%	8%	65%
Existing Facilities	HVAC Packaged AC >= 135 and < 240 kBTU/h TIER 1	300	18	1,464	437	3,585	5,485	27%	8%	65%
Existing Facilities	HVAC Packaged AC >= 135 and < 240 kBTU/h TIER 2	10,000	39	103,403	30,867	253,277	387,546	27%	8%	65%
Existing Facilities	HVAC Packaged AC >= 240 kBTU/h TIER 1	1,800	27	12,901	3,851	31,599	48,350	27%	8%	65%
Existing Facilities	HVAC Packaged AC >= 65 and < 135 kBTU/h TIER 1	2,400	25	16,015	4,781	39,227	60,022	27%	8%	65%
Existing Facilities	HVAC Packaged AC >= 65 and < 135 kBTU/h TIER 2	5,000	44	58,224	17,380	142,615	218,219	27%	8%	65%
Existing Facilities	HVAC Packaged HP < 65 kBTU/h TIER 1	7,200	29	56,491	16,863	138,371	211,725	27%	8%	65%
Existing Facilities	HVAC Packaged HP < 65 kBTU/h TIER 2	900	40	9,688	2,892	23,730	36,310	27%	8%	65%
Existing Facilities	HVAC Packaged HP >= 135 and < 240 kBTU/h TIER 1	400	18	1,951	582	4,780	7,314	27%	8%	65%
Existing Facilities	HVAC Packaged HP >= 65 and < 135 kBTU/h TIER 1	1,100	25	7,340	2,191	17,979	27,510	27%	8%	65%
Existing Facilities	HVAC Split AC < 65 kBTU/h TIER 1	50	29	392	117	961	1,470	27%	8%	65%
Existing Facilities	HVAC Split AC < 65 kBTU/h TIER 2	20	40	215	64	527	807	27%	8%	65%
Existing Facilities	HVAC Split HP < 65 kBTU/h TIER 1	800	29	6,277	1,874	15,375	23,525	27%	8%	65%
Existing Facilities	HVAC Split HP < 65 kBTU/h TIER 2	320	40	3,445	1,028	8,437	12,910	27%	8%	65%
Existing Facilities	HVAC Split HP >= 65 and < 135 kBTU/h TIER 1	600	25	4,004	1,195	9,807	15,006	27%	8%	65%
Existing Facilities	Chillers Air-Cooled Chiller < 150 Tons Eff Class 1	4,000	382	407,766	121,721	998,788	1,528,274	27%	8%	65%
Existing Facilities	Chillers Air-Cooled Chiller >= 150 Tons Eff Class	2,500	420	279,964	83,571	685,748	1,049,284	27%	8%	65%
Existing Facilities	HVAC EC Motors For Fans EC Motors For Fans	600	3,493	466,501	226,718	1,402,336	2,095,555	22%	11%	67%
Existing Facilities	Programmable Thermostat Programmable Thermo	800	3,161	754,452	0	1,773,967	2,528,419	30%	0%	70%
Existing Facilities	Smart Thermostat Smart Thermostat Smart Thermo	700	1,458	272,361	81,302	667,125	1,020,787	27%	8%	65%
Existing Facilities	Chillers Water-Cooled Chiller < 150 Tons Eff Cla	750	278	55,539	16,579	136,038	208,155	27%	8%	65%
Existing Facilities	Chillers Water-Cooled Chiller < 150 Tons Eff Cla	1,200	452	144,631	43,173	354,261	542,064	27%	8%	65%
Existing Facilities	Chillers Water-Cooled Chiller >= 150 Tons and < 3	3,500	476	444,313	132,631	1,088,308	1,665,252	27%	8%	65%
Existing Facilities	Chillers Water-Cooled Chiller >= 300 Tons and < 4	2,000	407	217,168	64,826	531,934	813,928	27%	8%	65%
Existing Facilities	Chillers Water-Cooled Chiller >= 400 Tons and < 6	10,000	416	1,110,988	331,638	2,721,273	4,163,900	27%	8%	65%
Existing Facilities	Chillers Water-Cooled Chiller >= 600 Tons Eff Cl	12,800	350	1,194,561	356,585	2,925,978	4,477,125	27%	8%	65%
Existing Facilities	Building Envelope High Performance Glazing High	8,000	4	8,088	2,414	19,810	30,311	27%	8%	65%
Existing Facilities	Building Envelope Shade Screen Shade Screen	2,000	23	12,013	3,586	29,425	45,024	27%	8%	65%
Existing Facilities	Motor VSD Air Compressor	40	2,353	21,609	8,829	63,675	94,113	23%	9%	68%
Existing Facilities	Motor VSD Chilled Water Pump	740	2,373	403,137	164,712	1,187,904	1,755,753	23%	9%	68%
Existing Facilities	Motor VSD Condenser Water Pump	800	1,553	285,182	116,519	840,332	1,242,033	23%	9%	68%
Existing Facilities	Motor VSD Cooling Tower Fan	500	556	63,885	26,102	188,247	278,234	23%	9%	68%
Existing Facilities	Motor VSD Domestic Water Pump	450	1,308	135,127	55,210	398,173	588,510	23%	9%	68%
Existing Facilities	Motor VSD HVAC Fan	3,500	2,459	1,975,798	807,265	5,821,992	8,605,055	23%	9%	68%
Existing Facilities	Motor VSD Other/Misc	30	1,573	10,837	4,428	31,934	47,199	23%	9%	68%
Existing Facilities	Motor VSD Pool Pump	130	3,866	115,390	47,146	340,014	502,549	23%	9%	68%
Existing Facilities	Motor VSD Process Motor	400	1,028	94,460	38,594	278,342	411,397	23%	9%	68%
Existing Facilities	Motor VSD Refrigeration Compressor	25	987	5,667	2,315	16,699	24,681	23%	9%	68%
Existing Facilities	Motor VSD Waste Water Blowers	200	1,910	87,688	35,827	258,386	381,901	23%	9%	68%
Existing Facilities	Refrigeration/Miscellaneous Refrigeration Anti-S	141	302	8,272	3,895	30,387	42,554	19%	9%	71%
Existing Facilities	Refrigeration/Miscellaneous Refrigeration Bever	25	1,715	8,333	3,924	30,610	42,866	19%	9%	71%
Existing Facilities	Refrigeration/Miscellaneous Refrigeration Floati	10	1,958	3,806	1,792	13,979	19,577	19%	9%	71%

Appendix B
Load Shape of Energy Savings from DSM Measures

Program Name	Measure Name	2020 Participation	Per-unit Savings at Generator (kWh/unit)	Total Savings in Each Period Across All Units				Percent of Net Load Shift Occurring in Each		
				3-8pm Weekdays All Year	10am-2pm Weekdays October-April	Remaining Load	Total Saved	3-8pm Weekdays All Year (14% of Hours/Year)	10-2pm Weekdays October-April (7% of Hours/Year)	Remaining Hours (79% of Hours/Year)
Existing Facilities	Refrigeration/Miscellaneous Refrigeration High- Efficiency	400	1,959	152,325	71,722	559,532	783,578	19%	9%	71%
Existing Facilities	Refrigeration/Miscellaneous Refrigeration Reach	40	1,278	9,938	4,679	36,503	51,120	19%	9%	71%
Existing Facilities	Refrigeration/Miscellaneous Refrigeration Snack	25	343	1,667	785	6,122	8,573	19%	9%	71%
Existing Facilities	HVAC Cntrl EMS EMS Replacing Digital EMS - Tier	1,200,000	3	989,027	151,022	2,011,057	3,151,106	31%	5%	64%
Existing Facilities	HVAC Cntrl EMS EMS Replacing Digital EMS - Tier	1,700,000	4	1,790,621	301,927	3,954,291	6,046,839	30%	5%	65%
Existing Facilities	HVAC Cntrl EMS EMS Replacing Programmable T-s	380,000	4	400,257	67,489	883,900	1,351,646	30%	5%	65%
Existing Facilities	HVAC Cntrl EMS Integrated Lighting Control	444,149	2	284,753	34	728,043	1,012,829	28%	0%	72%
Existing Facilities	HVAC Cntrl EMS EMS Replacing Non-Programmab	210,000	3	207,006	34,092	448,207	689,305	30%	5%	65%
Existing Facilities	HVAC Cntrl EMS EMS Replacing Non-Programmab	300,000	4	381,641	68,110	884,111	1,333,862	29%	5%	66%
Existing Facilities	HVAC Cntrl EMS EMS Replacing Pneumatic T-stats	44,000	4	55,974	9,989	129,670	195,633	29%	5%	66%
Existing Facilities	Whole Building Construction >= 20% < 30%	90,000	6	133,372	64,857	386,248	584,477	23%	11%	66%
Existing Facilities	Whole Building Construction >= 30% < 40%	115,000	8	220,223	107,092	637,772	965,087	23%	11%	66%
New Construction and Major Renovation	HVAC Packaged AC < 65 kBtu/h TIER 1	150	29	1,180	352	2,890	4,423	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged AC <= 65 kBtu/h Advanced TIER	275	54	3,987	1,190	9,767	14,944	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged AC >= 135 and < 240 kBtu/h TIER 2	1,124	39	11,622	3,469	28,468	43,560	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged AC >= 240 kBtu/h TIER 1	270	27	1,935	578	4,740	7,253	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged AC >= 65 and < 135 kBtu/h TIER 1	1,384	25	9,235	2,757	22,621	34,613	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged AC >= 65 and < 135 kBtu/h TIER 2	681	44	7,930	2,367	19,424	29,721	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged HP < 65 kBtu/h TIER 1	109	29	857	256	2,099	3,211	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged HP < 65 kBtu/h TIER 2	226	40	2,433	726	5,959	9,118	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged HP >= 65 and < 135 kBtu/h TIER 1	216	25	1,441	430	3,530	5,402	27%	8%	65%
New Construction and Major Renovation	HVAC Packaged HP >= 65 and < 135 kBtu/h TIER 2	340	44	3,959	1,182	9,698	14,839	27%	8%	65%
New Construction and Major Renovation	HVAC Split AC < 65 kBtu/h TIER 2	100	40	1,076	321	2,637	4,034	27%	8%	65%
New Construction and Major Renovation	Chillers Air-Cooled Chiller < 150 Tons Eff Class 1	500	382	50,971	15,215	124,848	191,034	27%	8%	65%
New Construction and Major Renovation	Chillers Air-Cooled Chiller < 150 Tons Eff Class 2	200	604	32,235	9,622	78,957	120,814	27%	8%	65%
New Construction and Major Renovation	Chillers Air-Cooled Chiller >= 150 Tons Eff Class	500	420	55,993	16,714	137,150	209,857	27%	8%	65%
New Construction and Major Renovation	HVAC EC Motors For Fans EC Motors For Fans	8	3,493	5,957	2,895	17,907	26,759	22%	11%	67%
New Construction and Major Renovation	Chillers Water-Cooled Chiller < 150 Tons Eff Cla	500	278	37,026	11,052	90,692	138,770	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller < 150 Tons Eff Cla	200	452	24,105	7,196	59,043	90,344	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller >= 150 Tons and < 3	600	392	62,684	18,712	153,540	234,936	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller >= 150 Tons and < 3	200	476	25,389	7,579	62,189	95,157	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller >= 300 Tons and < 4	900	346	82,982	24,771	203,257	311,009	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller >= 300 Tons and < 4	300	407	32,575	9,724	79,790	122,089	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller >= 400 Tons and < 6	2,000	352	188,035	56,130	460,575	704,740	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller >= 400 Tons and < 6	750	416	83,324	24,873	204,095	312,292	27%	8%	65%
New Construction and Major Renovation	Chillers Water-Cooled Chiller >= 600 Tons Eff Cla	4,000	350	373,300	111,433	914,368	1,399,101	27%	8%	65%
New Construction and Major Renovation	Building Envelope High Performance Glazing High	80,000	4	80,875	24,142	198,097	303,113	27%	8%	65%
New Construction and Major Renovation	Motor VSD Domestic Water Pump	120	1,308	36,034	14,723	106,179	156,936	23%	9%	68%
New Construction and Major Renovation	Motor VSD HVAC Fan	34	2,459	18,911	7,727	55,725	82,363	23%	9%	68%
New Construction and Major Renovation	Motor VSD Other/Misc	6	1,573	2,167	886	6,387	9,440	23%	9%	68%
New Construction and Major Renovation	Motor VSD Process Motor	1,000	1,028	236,151	96,486	695,855	1,028,492	23%	9%	68%
New Construction and Major Renovation	Motor VSD Waste Water Blowers	130	1,910	56,997	23,288	167,951	248,235	23%	9%	68%
New Construction and Major Renovation	Refrigeration/Miscellaneous Refrigeration High- Efficiency	12	1,959	4,570	2,152	16,786	23,507	19%	9%	71%
Schools	Lighting Outdoor Lighting LED Watts <= 50	1,138	651	84,615	0	655,681	740,296	11%	0%	89%
Schools	Lighting Outdoor Lighting LED Watts >50 & <300	443	1,805	91,384	0	708,133	799,516	11%	0%	89%
Schools	Interior Lighting LED Lighting LED Lamps NO Refle	2,400	161	82,102	70,490	234,248	386,840	21%	18%	61%
Schools	Interior Lighting LED Lighting MR-16 LED Lamps	40	145	1,231	1,057	3,511	5,798	21%	18%	61%
Schools	Interior Lighting Linear LED 2-foot lamp	498	28	2,925	2,511	8,346	13,782	21%	18%	61%
Schools	Interior Lighting Linear LED 3-foot lamp	73	59	916	786	2,613	4,315	21%	18%	61%
Schools	Interior Lighting Linear LED 4-foot lamp	52,042	56	621,152	533,302	1,772,230	2,926,684	21%	18%	61%
Schools	HVAC Packaged AC < 65 kBtu/h TIER 1	12,000	29	94,152	28,105	230,618	352,875	27%	8%	65%
Schools	HVAC Packaged AC < 65 kBtu/h TIER 2	600	40	6,459	1,928	15,820	24,207	27%	8%	65%

Appendix B
Load Shape of Energy Savings from DSM Measures

Program Name	Measure Name	2020 Participation	Per-unit Savings at Generator (kWh/unit)	Total Savings in Each Period Across All Units				Percent of Net Load Shift Occurring in Each		
				3-8pm Weekdays All Year	10am-2pm Weekdays October-April	Remaining Load	Total Saved	3-8pm Weekdays All Year (14% of Hours/Year)	10-2pm Weekdays October-April (7% of Hours/Year)	Remaining Hours (79% of Hours/Year)
Schools	Interior Lighting Linear LED 2-foot lamp	498	28	2,925	2,511	8,346	13,782	21%	18%	61%
Schools	Interior Lighting Linear LED 3-foot lamp	73	59	916	786	2,613	4,315	21%	18%	61%
Schools	Interior Lighting Linear LED 4-foot lamp	52,042	56	621,152	533,302	1,772,230	2,926,684	21%	18%	61%
Schools	HVAC Packaged AC < 65 kBtu/h TIER 1	12,000	29	94,152	28,105	230,618	352,875	27%	8%	65%
Schools	HVAC Packaged AC < 65 kBtu/h TIER 2	600	40	6,459	1,928	15,820	24,207	27%	8%	65%
Schools	HVAC Packaged AC >= 135 and < 240 kBtu/h TIER 1	6,000	18	29,271	8,737	71,696	109,704	27%	8%	65%
Schools	HVAC Packaged AC >= 135 and < 240 kBtu/h TIER 2	12,000	39	124,083	37,040	303,932	465,055	27%	8%	65%
Schools	HVAC Packaged HP < 65 kBtu/h TIER 1	12,000	29	94,152	28,105	230,618	352,875	27%	8%	65%
Schools	HVAC Packaged HP < 65 kBtu/h TIER 2	400	40	4,306	1,285	10,547	16,138	27%	8%	65%
Schools	HVAC Packaged HP >= 135 and < 240 kBtu/h TIER 1	300	18	1,464	437	3,585	5,485	27%	8%	65%
Schools	HVAC Packaged HP >= 135 and < 240 kBtu/h TIER 2	600	39	6,204	1,852	15,197	23,253	27%	8%	65%
Schools	HVAC Packaged HP >= 240 kBtu/h TIER 1	600	27	4,300	1,284	10,533	16,117	27%	8%	65%
Schools	HVAC Packaged HP >= 240 kBtu/h TIER 2	900	51	12,160	3,630	29,786	45,576	27%	8%	65%
Schools	HVAC Packaged HP >= 65 and < 135 kBtu/h TIER 1	2,531	25	16,889	5,041	41,368	63,298	27%	8%	65%
Schools	HVAC Packaged HP >= 65 and < 135 kBtu/h TIER 2	750	44	8,734	2,607	21,392	32,733	27%	8%	65%
Schools	HVAC Split AC < 65 kBtu/h TIER 1	184	29	1,440	430	3,527	5,396	27%	8%	65%
Schools	Chillers Air-Cooled Chiller < 150 Tons Eff Class 1	210	382	21,408	6,390	52,436	80,234	27%	8%	65%
Schools	Chillers Air-Cooled Chiller >= 150 Tons Eff Class 1	500	420	55,993	16,714	137,150	209,857	27%	8%	65%
Schools	Chillers Air-Cooled Chiller >= 150 Tons Eff Class 2	176	502	23,582	7,039	57,762	88,384	27%	8%	65%
Schools	HVAC EC Motors For Fans EC Motors For Fans	49	3,493	38,318	18,622	115,186	172,127	22%	11%	67%
Schools	Chillers Water-Cooled Chiller >= 300 Tons and < 400 Tons Eff Class 1	800	346	73,762	22,018	180,673	276,453	27%	8%	65%
Schools	Chillers Water-Cooled Chiller >= 400 Tons and < 600 Tons Eff Class 1	1,000	352	94,017	28,065	230,288	352,370	27%	8%	65%
Schools	Chillers Water-Cooled Chiller >= 600 Tons Eff Class 1	1,300	350	121,323	36,216	297,170	454,708	27%	8%	65%
Schools	Chillers Water-Cooled Chiller >= 600 Tons Eff Class 2	600	385	61,624	18,395	150,943	230,962	27%	8%	65%
Schools	Building Envelope High Performance Glazing High Performance Glazing	1,000	4	1,011	302	2,476	3,789	27%	8%	65%
Schools	Motor VSD Chilled Water Pump	50	2,373	27,239	11,129	80,264	118,632	23%	9%	68%
Schools	Motor VSD Condenser Water Pump	20	1,553	7,130	2,913	21,008	31,051	23%	9%	68%
Schools	Refrigeration/Miscellaneous IT Equip Computer Equipment	1,000	303	58,934	27,749	216,481	303,164	19%	9%	71%
Schools	HVAC Cntrl EMS EMS Replacing Digital EMS - Tier 1	47,190	3	38,893	5,939	79,085	123,917	31%	5%	64%
Schools	Whole Building Construction >= 20% < 30%	500	6	741	360	2,146	3,247	23%	11%	66%
Schools	Whole Building Construction >= 30% < 40%	323,000	8	618,540	300,789	1,791,306	2,710,636	23%	11%	66%
Existing Facilities	Air Dryer Upgrades	1	13	3	2	8	13	25%	12%	63%
Energy Storage and Load Management ("Rewe")	C&I Thermal Storage	1	-27	325	1	5	331	98%	0%	2%
Existing Facilities	CRAC	1,000	3,906	1,042,212	311,108	2,552,810	3,906,130	27%	8%	65%
Schools	CRAC	50	3,906	52,111	15,555	127,641	195,306	27%	8%	65%
New Construction and Major Renovation	CRAC	100	3,906	104,221	31,111	255,281	390,613	27%	8%	65%
Existing Homes	Variable Speed HVAC	1	672	202	16	453	672	30%	2%	67%

Appendix B
Load Shape of Energy Savings from DSM Measures

Program Name	Measure Name	2020 Participation	Per-unit Savings at Generator (kWh/unit)	Total Savings in Each Period Across All Units				Percent of Net Load Shift Occurring in Each		
				3-8pm Weekdays All Year	10am-2pm Weekdays October-April	Remaining Load	Total Saved	Weekdays All Year (14% of Hours/Year)	Weekdays October-April (7% of Hours/Year)	Remaining Hours (79% of Hours/Year)
Existing Facilities	Networked Thermostats	1,000	3,344	892,338	266,369	2,185,706	3,344,414	27%	8%	65%
New Construction and Major Renovation	Networked Thermostats	250	3,344	223,084	66,592	546,427	836,103	27%	8%	65%
Existing Facilities	Ultrasonic Humidification	4	135,353	92,824	44,686	403,902	541,413	17%	8%	75%
Existing Facilities	Upgraded Receiver	150	484	18,072	8,675	45,832	72,579	25%	12%	63%
Existing Facilities	Zero Loss Condensate Drains	100	2,935	73,073	35,075	185,313	293,462	25%	12%	63%
New Construction and Major Renovation	Zero Loss Condensate Drains	50	2,935	36,537	17,538	92,657	146,731	25%	12%	63%
Residential New Construction	Grid tied ERWH New Homes - Targeted	1,000	36	277,222	771	296,043	574,036	48%	0%	52%
Energy Storage and Load Management ("Rewa	Residential Electric Batteries - 2019 Installs	40	-335	137,999	0	21,375	159,374	87%	0%	13%
Energy Storage and Load Management ("Rewa	GIWH HPWH - 2019 Installs	230	2,313	172,659	17,024	369,424	559,107	31%	3%	66%
Residential New Construction	Induction Cooking	1,000	24	6,404	1,276	16,813	24,493	26%	5%	69%
Existing Facilities	HVAC Single Phase HP <= 65 kBtu/h Class 1 Eff C	3,000	24	23,033	5,428	42,360	70,821	33%	8%	60%
Existing Facilities	HVAC Single Phase HP <= 65 kBtu/h Class 2 Eff C	300	37	3,625	854	6,667	11,146	33%	8%	60%
Existing Facilities	HVAC Single Phase AC <= 65 kBtu/h Class 1 Eff C	4,000	20	26,220	6,179	48,221	80,620	33%	8%	60%
Existing Facilities	HVAC Single Phase AC <= 65 kBtu/h Class 2 Eff C	400	31	4,088	963	7,518	12,570	33%	8%	60%
Existing Facilities	HVAC Cntrl Hotel Room Occupancy Control Blend	4,500	955	886,765	516,771	2,892,497	4,296,033	21%	12%	67%
New Construction and Major Renovation	HVAC Cntrl Hotel Room Occupancy Control Blend	500	955	98,529	57,419	321,389	477,337	21%	12%	67%
Multi-Family Energy Efficiency	DI Water Heater Timers Pilot Measure - Targeted	1,000	36	1,931,463	5,348	2,087,288	4,024,099	48%	0%	52%
Multi-Family Energy Efficiency	Grid tied ERWH New Homes - Targeted	250	36	69,306	193	74,011	143,509	48%	0%	52%
Multi-Family Energy Efficiency	Induction Cooking	250	24	1,601	319	4,203	6,123	26%	5%	69%
Multi-Family Energy Efficiency	DI LED	40,000	59	480,846	148,708	1,713,162	2,342,717	21%	6%	73%
Existing Facilities	Custom	200,000	1	39,991	29,110	143,899	213,000	19%	14%	68%
Schools	Custom	10,000	1	2,000	1,455	7,195	10,650	19%	14%	68%

Attachment 1

<p style="text-align: center;">Attachment 1 Electric Vehicle Demand Management Pilot Program</p>

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<p>Attachment 1</p> <p>Electric Vehicle Demand Management Pilot Program</p>

Electric Vehicle Demand Management Pilot Program

Program Concept and Description

Electric Vehicles (EVs) have experienced robust annual market growth since first becoming widely available in the United States in 2011. EV market growth is accelerating as innovations in EV technology continue to bring longer vehicle range at reduced prices for consumers. EVs offer many advantages over internal combustion vehicles including improved energy efficiency, reduced fuel and maintenance costs, and lower emissions. When charging is managed to occur during off-peak periods, EVs can also help us balance electric system loads, better utilize existing grid infrastructure investments and integrate more clean energy onto the grid by charging EVs when intermittent renewable energy is available. Conversely, if EV charging is not properly managed, it can significantly increase peak demand and create potential transmission and distribution system challenges.

The Electric Vehicle Demand Management Pilot Program aims to proactively work with customers to manage EV charging behavior in the most efficient manner to provide benefits for all APS customers. The program will work with vehicle fleets, charging station infrastructure, and individual EV owners to gather better data on EV charging behavior and to encourage off-peak charging to manage peak demand.

The pilot program will include the following elements:

1. **EV Charging Baseline Data** – We will install data collection devices in participating EV owners' vehicles to track and record their EV charging activity and provide valuable baseline data on current EV charging behavior.
2. **Beneficial Charging Behavior** - After several months to establish baseline charging behavior, the program may then launch a rewards program for EV owners that will offer reward points in exchange for charging during certain hours and avoiding on-peak hours (as recorded through the in-vehicle data collection device). This approach has been successfully used in other utility EV programs.
3. **EV Charging Station Direct Load Control** - The pilot will work with EV charging station providers to connect EV charging stations into the APS Rewards distributed energy resource operating platform. Integration into the APS Rewards resource platform will enable direct load control of EV charging and participation in future utility demand response events, including potential limited test events in 2020.

Through this pilot program, APS can learn more about emerging EV charging behavior and how to work with customers to exercise dynamic scheduling of EV charging to occur during the most optimal times, as well as initiate demand response events when needed.

<p style="text-align: center;">Attachment 1</p> <p style="text-align: center;">Electric Vehicle Demand Management Pilot Program</p>

Target Market

The Electric Vehicle Demand Management Pilot Program will target EV owners in the APS service territory, including residential customers with individual passenger vehicles as well as commercial vehicle fleets where applicable. APS will target both existing EV owners as well as new EV buyers to encourage participation.

Current Baseline Conditions

Electric vehicle adoption is growing in both residential and commercial vehicle fleets. There are currently approximately 11,000 EVs within the APS territory as of September 2019, forecasted to be approximately 50,000 EVs by 2025. As EV adoption grows, it is essential to manage this significant additional energy demand on the grid. Typical residential, level two EV chargers can draw up to 6-7 kW, making them potentially the single highest energy demanding appliance in the home. APS provides many tools and resources for customers to help them save energy; however, there have been limited tools devoted to managing EV energy use.

The proposed pilot program will help gather better baseline data to understand charging behavior patterns of typical residential EV owners, providing valuable information to assist APS energy system planners and inform future program designs. It is important to institute early EV demand management programs to proactively address this significant added load on the grid and instill beneficial charging habits. If managed properly, there is an opportunity to use EVs to help balance demand on the grid and use energy during midday periods when there is often excess solar energy on the grid. This helps reduce costs for all customers while also utilizing excess carbon free solar energy that would otherwise need to be curtailed.

Program Eligibility

The program will target all EV owners within the APS service territory. Any APS customer who is an EV owner/operator may be eligible to participate, although certain elements of the program will be eligible for residential or commercial customers only.

Program Rationale and Objectives

The objective of the program is to dynamically manage EV charging and educate customers about beneficial charging behavior that occurs during off-peak periods whenever possible. Electric system benefits will be realized by managing EV charging based on seasonal and evolving distribution and system level needs, including demand response events as needed. This will result in significant customer benefits including fuel savings, lower transportation costs, reduced tailpipe emissions, and more efficient electric system operations that help manage future energy costs. By contrast, if left unmanaged, EV charging may result in unforeseen distribution system impacts.

Program Implementation

APS will work with multiple providers in the EV industry to implement the Electric Vehicle Demand Management Pilot Program, while also leveraging current DSM program implementation partners for customer outreach and awareness of the program.

<p style="text-align: center;">Attachment 1 Electric Vehicle Demand Management Pilot Program</p>

Partners may include providers of EV charging station infrastructure, the implementation partner who provides the distributed energy resources management system platform which will connect to the EV chargers, as well as providers of vehicle based EV devices that track and manage charging behavior through the vehicle. The program will be marketed to customers with support from APS DSM program implementation contractors for the non-residential programs and through the residential energy awareness field team.

Incentive Design

- Pilot participants who agree to share baseline data on their EV charging behavior by installing a charge tracking device in their car will receive an incentive of approximately \$85/year – based on estimated \$25 sign up incentive and \$5/month incentive for providing ongoing data. APS will evaluate pilot program baseline data to determine the specific design of future potential rewards points or other incentives to encourage off-peak charging behavior.
- In addition, APS may provide up to \$20,000 of incentives within the 2020 budget to encourage commercial EV charging stations to pilot the connected demand response element of the program.

Delivery Strategy and Administration

APS plans to deliver and administer the pilot program in-house with assistance from Implementation and Evaluation contractors.

- APS will work with existing residential and non-residential DSM implementation contractors and through existing communications channels to promote and implement the pilot program outreach.
- APS will engage with third parties to wirelessly track and/or manage electric vehicle charging stations and participating vehicles based on APS requirements.
- APS will work with a third-party evaluation contractor to assist in collecting and analyzing data for the pilot.

How to Leverage with Existing Programs

The pilot program will be integrated with current DSM program efforts and implemented with assistance from current program implementation contractors to leverage the existing program delivery and evaluation infrastructure.

Marketing and Communications

- The Pilot Program marketing and communications will be integrated with other DSM programs, messages and communications channels.
- APS will work closely with its Account Managers to inform APS customers and provide education materials to potential program participants.
- APS will conduct outreach targeted specifically to EV owners including working with commercial fleet managers, EV manufacturers and dealers.
- APS will conduct general awareness and education campaigns to increase customer awareness about the benefits of charging off-peak and importance of charging during midday before 3pm to utilize excess solar energy.

<p style="text-align: center;">Attachment 1</p> <p style="text-align: center;">Electric Vehicle Demand Management Pilot Program</p>

Program Implementation Schedule

APS will begin implementation of the pilot after Commission approval. APS plans to implement the pilot using existing program implementation contractors and delivery channels. This will ensure that pilot offerings are integrated with other potential DSM opportunities for customers and allows the pilot to leverage other program infrastructure and delivery channels. Due to this integrated approach, it is estimated that pilot program offerings could be available to customers starting within 180 days after approval.

Program Budget

The 2020 proposed budget is detailed below.

Table 1 – 2020 Electric Vehicle Demand Management Pilot Program

	2020
Rebates and Incentives	\$62,500
Training and Technical Assistance	\$0
Consumer Education	\$0
Program Implementation	\$200,000
Program Marketing	\$5,000
Planning and Administration	\$20,000
Total	\$287,500

Estimated Energy Savings

Based on 500 EVs participating in the pilot, the Electric Vehicle Demand Management Pilot Program could help shift up to 3 MW of demand if all vehicle charging were to occur off-peak. And by connecting to local commercial EV charging stations, the pilot will enable additional EV demand response capacity in the future. A main objective of the pilot will be to gather information about EV charging behavior to assess what the future savings potential is from EV demand management programs so that savings estimates can be refined based on the data collected from the pilot.

Cost Effectiveness

The pilot program provides significant customer benefits – including individual participant benefits and non-participant benefits for all customers due to the strategic load that managed EV charging can provide to help flatten the overall APS system load shape. Traditional EE cost effectiveness tests are limited in how to measure all the benefits of EVs and need to be adapted to provide an accurate metric for Arizona. A key objective of the pilot will be to gather data to inform the cost effectiveness analysis and APS intends to report on the benefits, costs, load management impacts, and cost effectiveness results of the pilot in the DSM Annual Progress Report.

Attachment 2

<p>Attachment 2 Subscription Rate Pilot Program</p>

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<p style="text-align: center;">Attachment 2 Subscription Rate Pilot Program</p>

Subscription Rate Pilot Program

Program Concept and Description

APS will undertake a two-year Subscription Rate Pilot intended to study customer experience, energy usage behavior patterns, and response/uptake to smart thermostat load management technology in conjunction with a fixed monthly subscription rate offering.

The pilot design will include a group of up to 2500 customers in existing single family homes who will be provided with connected smart thermostats to optimize the operation of these devices for managing energy demand. An additional group of up to 2500 customers in existing single family homes will be recruited to participate without connected thermostats, allowing for a comparison between the two groups.

The Study will evaluate two main groups of customers as follows:

1. Subscription Rate with a Smart Thermostat
2. Subscription Rate without a Smart Thermostat

The total Study group will be comprised of not more than 5,000 customers total.

Target Market

APS residential customers in single family homes who are interested in participating in a new subscription rate pilot plan and who are willing to share their energy usage data and feedback as part of a research study pilot program.

Current Baseline Conditions

Subscription rate plans are not currently available for APS residential customers.

Program Eligibility

Participation in the Study will be made available on an opt-in basis to interested customers within APS's service territory. In order to be eligible for Study participation, customers must:

1. Have one year of historical usage data.
2. Be willing to commit to on-going surveys during the pilot.
3. Live in an owner occupied, single family home with an internet connection (Note: internet connection is only required for those with a Smart Thermostat).

For the Subscription Rate with a Smart Thermostat:

1. Install one qualifying smart thermostat (or to have one installed) for each HVAC unit in the enrolled property.
 - a. Participants must agree to allow APS to optimize smart thermostat operation to manage energy demand within +/- 3 degrees from the

<p style="text-align: center;">Attachment 2 Subscription Rate Pilot Program</p>

thermostat setting. Participants would always retain the ability to manually override settings whenever they choose without penalty.

- b. If a participant elects to have the smart thermostat professionally installed, the installation will be offered through qualified contractors at a discounted rate. For qualifying limited income participants, professional smart thermostat installation and a free package of LED bulbs will be provided at no cost. To qualify, a participant must meet eligibility requirements of APS's Energy Support Program.

Program Implementation

This pilot program will be implemented in-house and evaluated by a third party evaluation contractor. The pilot will leverage existing DSM programs (i.e. Existing Homes and Rewards Programs) to provide support for smart thermostat installation and management.

APS has designed the pilot study to be implemented according to the following parameters:

1. APS will establish a Technical Advisory Committee and a Customer Advisory Board with the latter being comprised of participating customers.
2. Participant satisfaction will be measured at regular intervals via surveys and other available mechanisms.
3. Participants' underlying costs will be calculated by applying the customer's monthly billed kWh and kW units from the prior 12 months to the current charges in the applicable retail rate schedule.
4. Participating customers may elect to return to any available standard rate offering at any time. Customers who choose to opt-out prior to the conclusion of the Study, shall return, or buy, any provided devices (with the exception of qualifying limited income participants).

Incentive Design and Study Method

Participating Customer Incentives:

Participating customers will be compensated for participation in the study as follows:

1. \$50 Enrollment incentive – awarded after enrollment and upon completion of first participant survey.
2. \$5 Survey completion incentive - \$5 incentive awarded for each subsequent survey completed.

A customer's monthly subscription rate will be based on their historical usage data and locked for a two-year span. The price will be based on the amount the customer is anticipated to pay under their existing rate, plus an additional percentage as follows:

- For up to 2500 pilot study participants without a connected smart thermostat, 5% will be added to the charges above to set their flat bill amount.

<p style="text-align: center;">Attachment 2 Subscription Rate Pilot Program</p>

- For up to 2500 pilot study participants with a connected smart thermostat, 0% will be added to their charges above to set their flat bill amount.

Delivery Strategy and Administration

APS plans to deliver and administer the Subscription Rate Pilot Program in-house with assistance from Implementation and Evaluation contractor partners as needed.

- APS will work with existing residential DSM implementation contractors and through existing communications channels to promote and implement the pilot program outreach.
- APS will engage with third parties to purchase and install rate optimized smart thermostats and connect them to the cloud based Rewards distributed energy resource management platform to allow ongoing tracking and shared device management.
- APS will work with a third party evaluation contractor to assist in collecting and analyzing data for the pilot.

Program Budget

The 2020 proposed budget is \$1,500,000 to support all pilot program implementation, participant incentives, and pilot evaluation research activities.

Estimated Energy Savings

The Subscription Rate Pilot Program is a research study designed to assess the energy usage and load shape impacts from an innovative subscription rate design with and without shared management of distributed energy resources. The data collected from the pilot will be used to identify future energy savings and load management opportunities from this program approach.

Measurement, Evaluation, Research and Reporting

APS will evaluate the customer experience and energy usage behaviors throughout the pilot, including but not limited to:

1. Customer feedback through various channels, including but not limited to the Customer Advisory Group and participant customer surveys.
2. Tracking participating customer usage information.

This program will be offered consistent with the Subscription Pilot Rate Rider Residential filed in APS's 2019 Rate Case. In the event of any conflict between the terms of this Attachment and the subsequently approved Rate Rider, the terms of the Rate Rider will apply. APS will report on Study findings in the DSM Annual Progress Report, including findings as outlined in the measurements outlined above.